THE COMPLETE AIRCRAFT REFERENCE MAGAZINE

Model AIRCRAFT Monthly



First of the RAF's Heavies
Short Stirling

Modelling
Mosquito PR Mk I
Daguet Jaguar

Royal Flying Corps – PC10
Mosquito PR Mk I/B Mk IV
Daguet Jaguar

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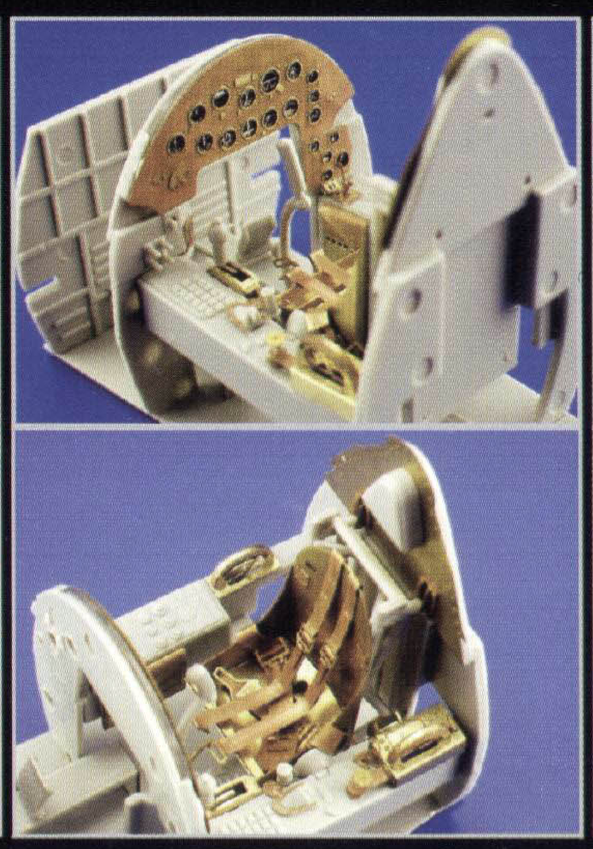
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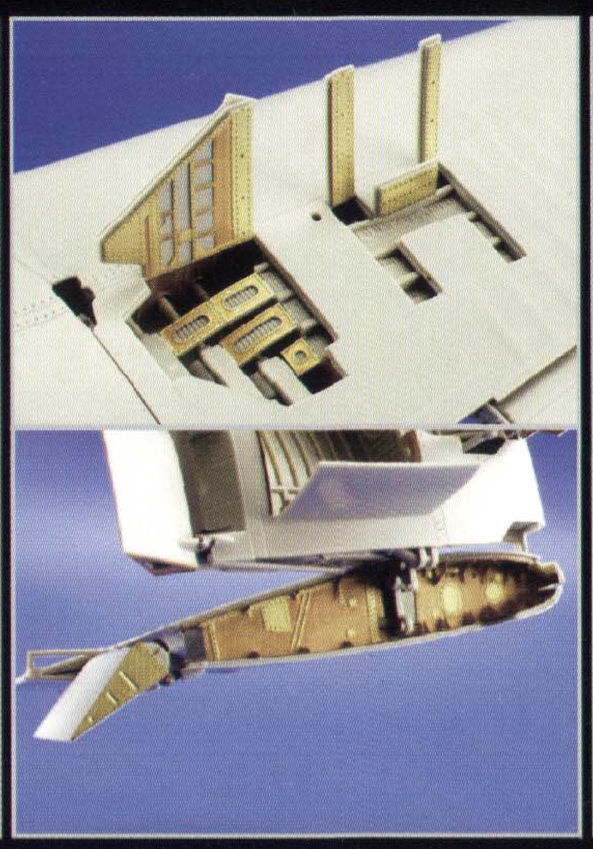
32115 ***MiG-29 Fulcrum Interior set***



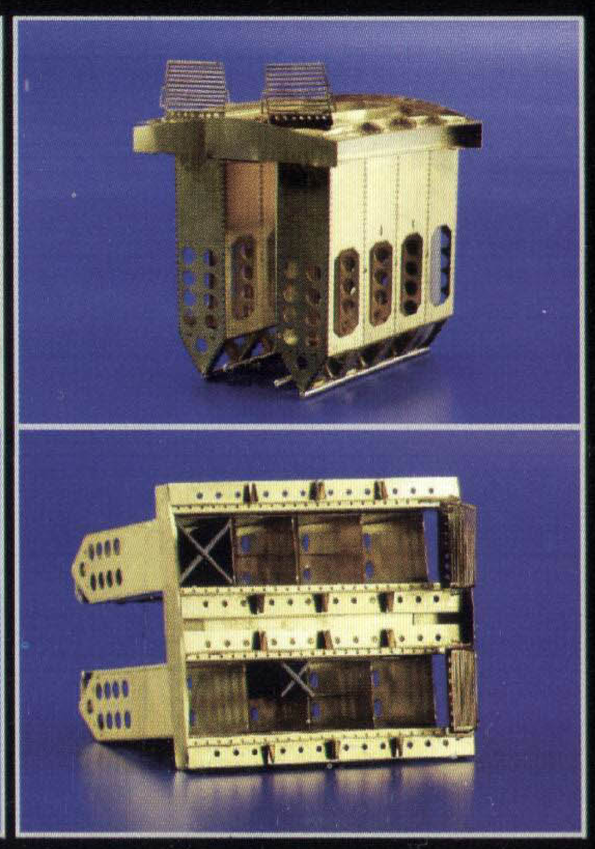
32118 **F4U-1 Corsair interior set**



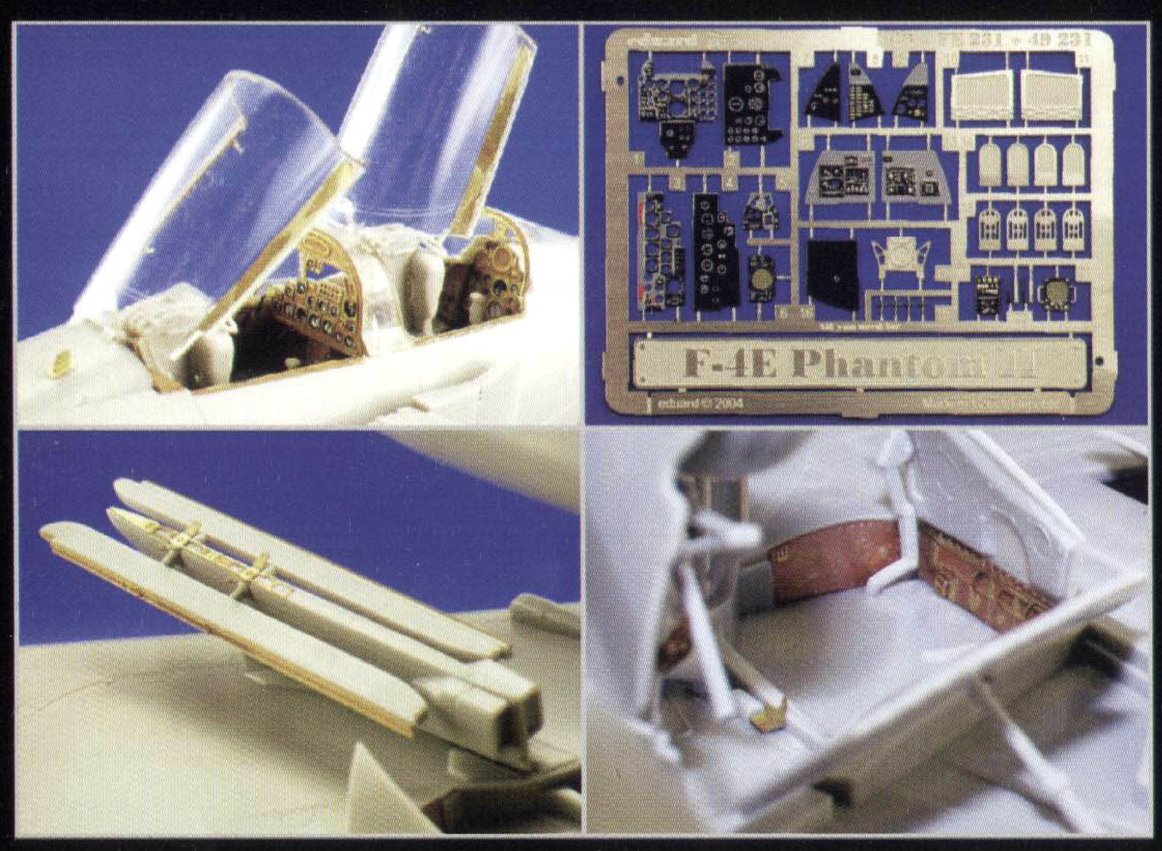
32112 ***F4U-1 Corsair I exterior***



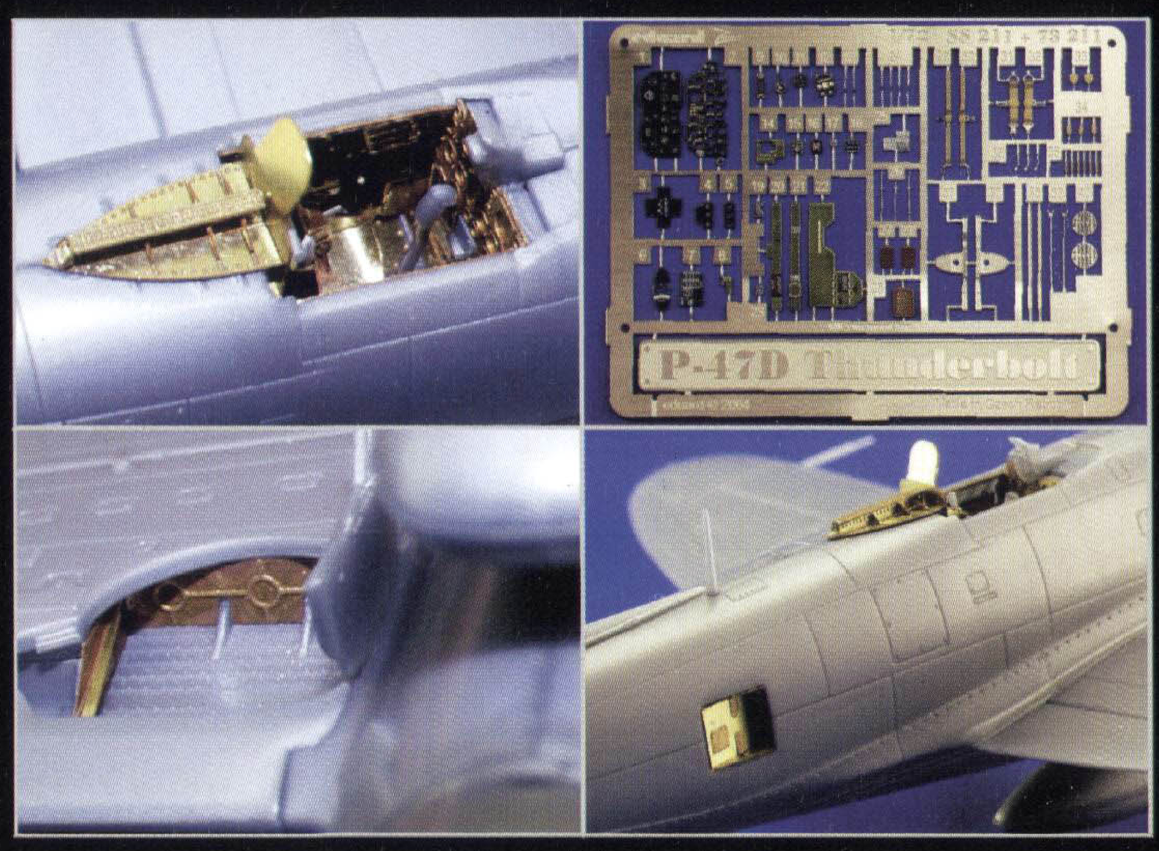
48426 ***He-111 bomb bay***



49231 ***F-4E Phantom II***



73211 ***P-47D-30 Thunderbolt***



Color photo etched sets

Color photo etched set - Aircraft - 1/32
32513 F-105 ejection seat
32502 F-14A Seat det. Set GRU7A
32517 F-16 Falcon placards
32508 F-18 Hornet placards
32511 F-4 MB Mk.7 ejection seat /Green type
32512 F-4 MB Mk.7 ejection seat /Grey type
32509 F-4 Phantom II Placards
32503 F-4E Phantom II interior set
32510 F/A-18 Hornet interior
32504 Seatbelts IJA
32505 Seatbelts IJN
32507 Seatbelts Luftwaffe WW.II
32506 Seatbelts USAF & USN WW.II Late

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49218 A6M3 Zero Type22
49209 AH-64A Apache
49201 AH-64D Apache
49008 Ammunition Belts 12,7mm US
49013 Ammunition belts German MG131 13mm
49220 Bf 109E 4/7
49205 Bf-109E3
49211 Bf-109G-6
49222 F-104C/3 Starfighter
49229 F-14A Tomcat
49204 F-16CJ Block 50
49223 F-18C Hornet
49014 F-4 MB Mk.7 ejection seat /Green type
49015 F-4 MB Mk.7 ejection seat /Grey type
49231 F-4E Phantom II
49236 F-86F Sabre
49230 F/A-18 GRU/SJU seat.det set
49227 F14 Seat det.set (GRU Mk. 7A)
49215 F4U-1D Corsair
49214 Fw-190A3
49210 Fw-190D-9
49200 Ju-87B Stuka
49202 Ki-43 II Oscar
49207 La-7
49206 Me-262-A
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49239 Mosquito FB Mk.VI/NF Mk.II
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49226 P-47D Razorback
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49219 P-51B Mustang
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49010 Seatbelts France
49005 Seatbelts IJA
49004 Seatbelts IJN
49003 Seatbelts Luftwaffe WWII Bombers
49002 Seatbelts Luftwaffe WWII Fighters
49007 Seatbelts RAF Late
49006 Seatbelts RAF WW.II
49011 Seatbelts RFC WW.I
49001 Seatbelts USAF & USN WWII
49012 Seatbelts USN early
49203 Spitfire Mk.IX c
49212 Swordfish Mk.I
49194 WWI instruments

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73007 Ammunition Belts 12,7mm US
73199 Bf-109E-4/7
73208 F-15C Eagle
73204 F-15E Strike Eagle
73202 F-16CJ Fighting Falcon
73201 F-4E Phantom II
73209 F-4J Phantom II
73203 Fw-190A3
73212 Mosquito B.Mk.IV/PR Mk.IV
73211 P-47D-30 Thunderbolt
73206 P-51D Mustang
73008 Remove Before Flight
73001 Seatbelts IJA/IJN
73003 Seatbelts Luftwaffe WWII Bombers
73002 Seatbelts Luftwaffe WWII Fighters
73006 Seatbelts RAF Q type
73005 Seatbelts RAF WWII
73004 Seatbelts USAF & USN WWII

Color photo etched set - ZOOM - Aircraft - 1/48
FE218 A6M3 Zero Type22
FE209 AH-64A Apache
FE201 AH-64D Apache
FE220 Bf 109E 4/7
FE205 Bf-109E3
FE211 Bf-109G-6
FE222 F-104C/J Starfighter
FE229 F-14A Tomcat
FE204 F-16CJ Block 50
FE196 F-18 Hornet placards
FE223 F-18C Hornet
FE231 F-4E Phantom II
FE215 F4U-1D Corsair
FE214 Fw-190A3
FE210 Fw-190D-9
FE200 Ju-87B Stuka
FE202 Ki-43 II Oscar
FE207 La-7
FE206 Me-262-A
FE213 Meteor F.3
FE232 Mig-15 Fagot
FE239 Mosquito FB Mk.VI/NF Mk.II
FE208 P-38J Lightning
FE195 P-39 Aircobra Placards
FE241 P-40E Kittyhawk
FE233 P-40N Warhawk
FE219 P-51 B Mustang
FE198 P-51 Mustang placards
FE216 P-51D Mustang
FE226 P47D Razorback
FE197 P47D Thunderbolt Placards
FE199 Spitfire Mk.I
FE203 Spitfire Mk.IX c
FE212 Swordfish Mk.I

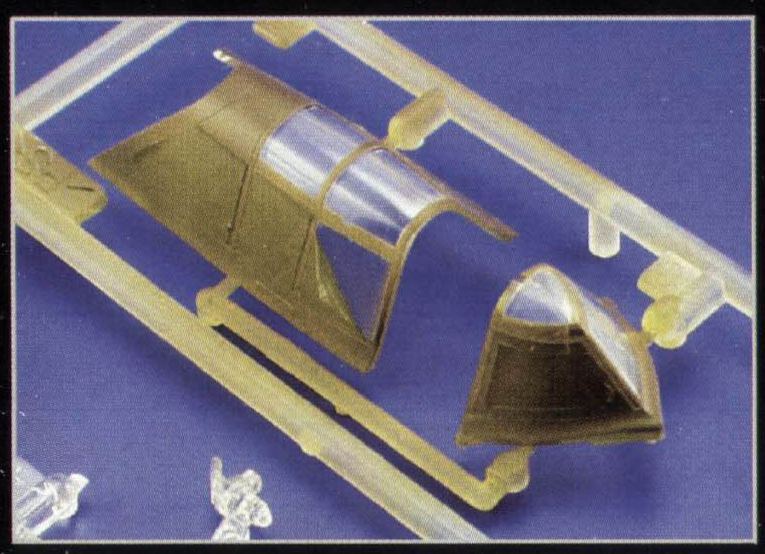
Color photo etched set - ZOOM - Aircraft - 1/72
SS200 A6M5c Zero
SS208 F-15C Eagle
SS204 F-15E Strike Eagle
SS202 F-16CJ Fightng Falcon
SS201 F-4E Phantom II
SS209 F-4J Phantom
SS212 Mosquito B.Mk.IV/PR Mk.IV
SS211 P-47D-30 Thunderbolt

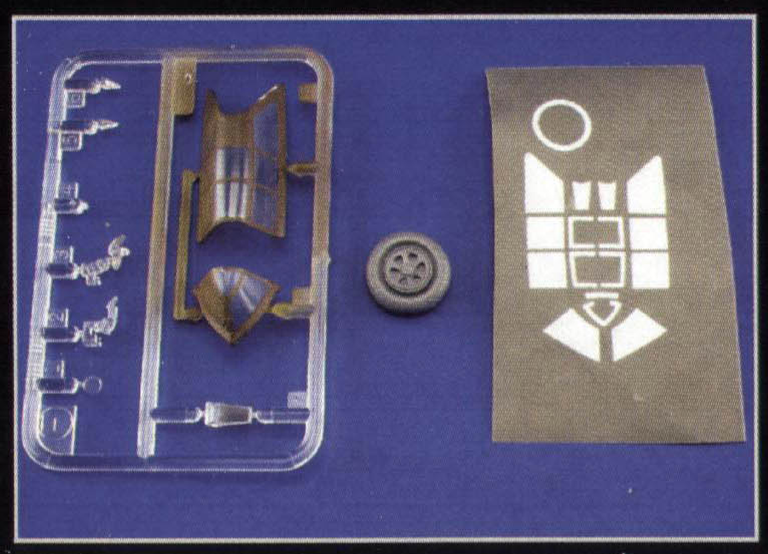
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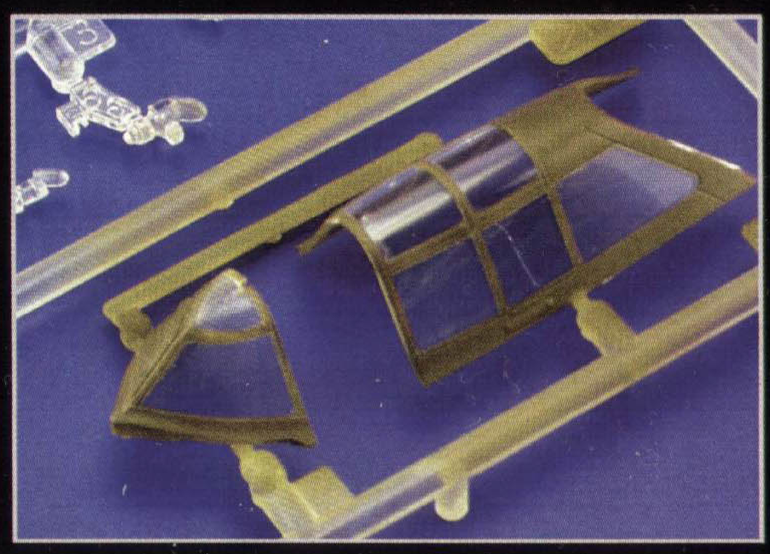
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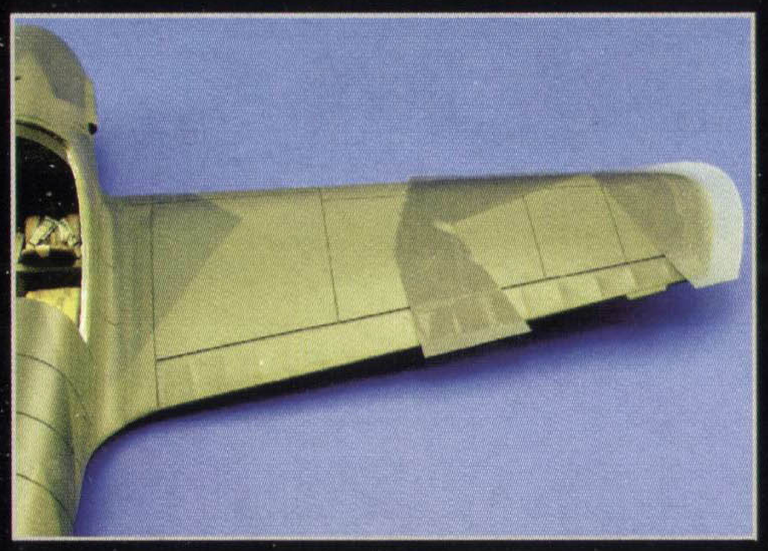
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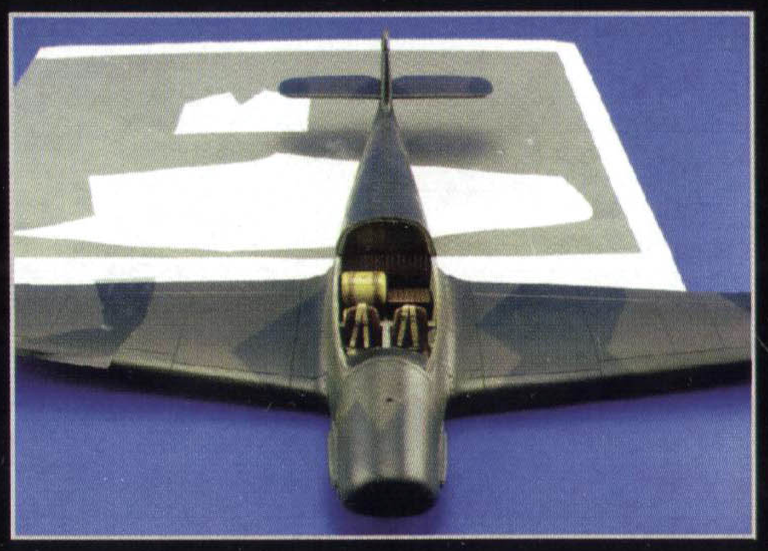
Express Mask

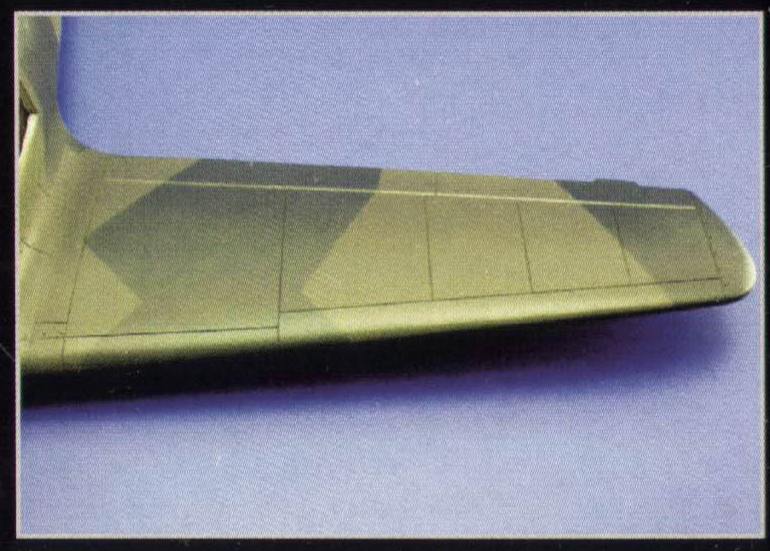


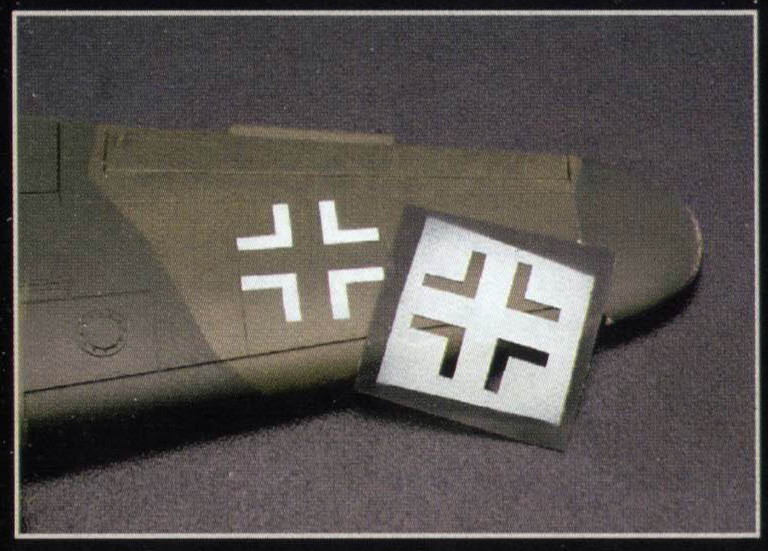




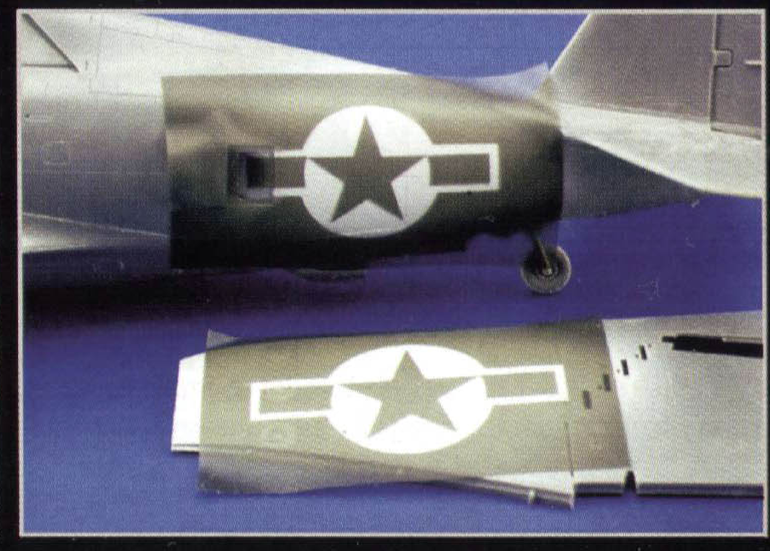


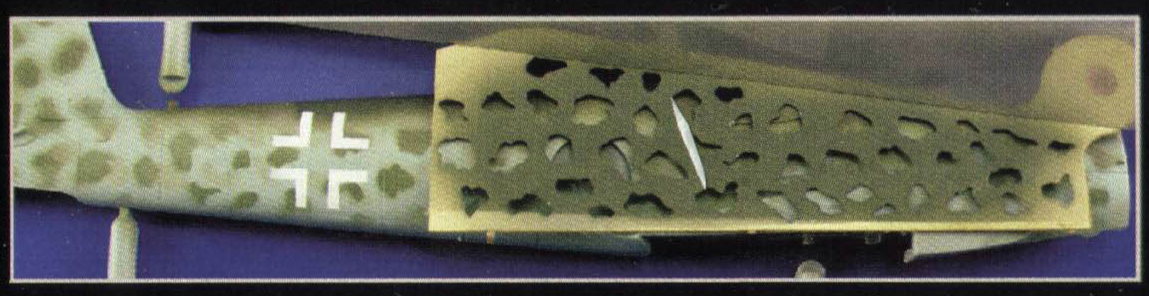


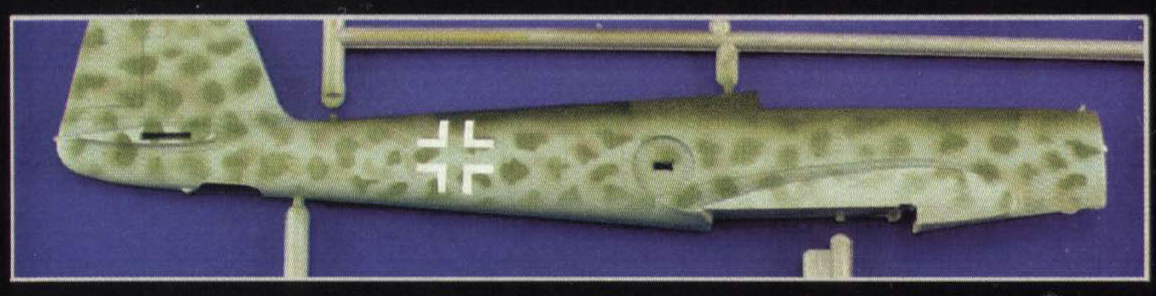












Express mask - Aircraft - 1/32
XL054 Beaufighter
XL522 F-104 Starfighter etch stencil data mask
XL053 F-105D Thunderchief
XL052 F-105G Wild Weasel
XL518 F-117 Stealth etch stencil data mask
XL521 F-15 Eagle etch stencil data mask
XL520 F-16 Falcon etch stencil data mask
XL516 F-18 Hornet etch stencil data mask
XL517 F-4 Phantom II etch stencil data mask
XL055 F4U-1B Corsair I
XL523 Me-262 Schwalbe Nat.insignia
XL056 MiG 3
XL519 MiG-3 National insignia

Express mask - Aircraft - 1/48
XF219 A-1H Skyraider
XF570 Bf-109E/F National insignia
XF571 Bf-109G/K National insignia
XF222 Hudson
XF215 Ju-188E
XF574 Ju-52 National insignia
XF573 Ju-88/188 National insignia
XF572 Ju-88/188 Night fight. Nat. Insignia
XF221 Kübelwagen
XF220 MB-326A
XF217 Mits. F-2A
XF218 P-40E Kittyhawk
XF216 P-47D Thunderbolt "Bubbletop"
XF206 U-2

Express mask - Aircraft - 1/72
XS245 B-2 Stealth
XS244 B-25H Mitchell
XS233 B-25J Mitchell
XS234 B-58 Hustler
XS227 BK 117
XS235 Br.1150 Atlantic
XS223 C-45 Expeditor
XS220 F-18A/B/C
XS236 F-18C Hornet
XS246 F-8 Crusader
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XS562 Ju-88/188 Night Fight. Nat. Insignia
XS237 Ju-88S
XS229 Mig-29 Fulcrum
XS248 MiG-31 Foxhound
XS242 MU-2
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XS238 SM-79 Sparviero
XS564 Spad XIII France Camo scheme
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XS241 T-33 Shooting Star
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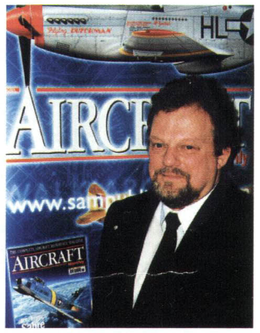




LEFT Jaguar A, A153, 11-RA of EC 3/11 'Corse', photographed back at its home base of Toul-Rosières. Note the Matra R550 Magic 2 air-to-air missile on the starboard outer wing pylon and the starboard engine panel in the standard European grey/green camouflage scheme. (Del Bianco via Andy Evans)

editorial

MAM's new boy!



'MODEL AIRCRAFT MONTHLY' HAS now got its own exclusive editor – me! Richard has done a sterling job over the last two and a half years, editing no less than three SAM Publications' titles, plus the Datafile books. It has now been decided that 'MAM' should have its own editor from now on – so 'Hello and welcome' from the 'new boy'.

I have been 'involved' with aviation/modelling publications for over thirty years, cutting my journalistic teeth as it were on 'Scale Models' way back in the 1970s, and if there is one thing that I have learnt during this time, it is you cannot please all of the readers all of the time - however you can try to please most of the readers most of the time, which is exactly what I will hopefully continue to do.

My remit is simple. To produce a monthly aviation reference magazine that will be of interest to aircraft enthusiasts and modellers alike. The main thrust of the contents will be on real aviation - mainly reference and/or research topics; pushing the boundaries of our collective knowledge of all the areas of aviation history. When and where possible these will be complemented by related modelling articles and of course plenty of colour scheme and markings profiles and four-views.

I intend to keep my 'modelling hand in' by indulging my editorial prerogative and producing articles on whatever research and/or modelling project I happen to be working on at the time, but rest assured, this will not be at the expense of other contributors' articles, of which we have a very able and growing band.

All the regular 'MAM' features will be kept, developed and in some cases expanded, and we have plans to introduce some 'new' regular features. Three areas that will definitely be expanded will be the 'In Print' book reviews, 'Forum' readers' letters and the 'PhotoRef' photographic features.

We will also be looking at introducing a Readers' Models page where readers can send in photographs of their models, and we will be starting a regular look at the pewter/white metal/die-cast modelling industry which is increasing in popularity amongst aircraft enthusiasts and modellers.

To sum up, my aim is to keep 'MAM' an essential part of your reading matter, whether you are an aircraft enthusiast or a scale modeller - or indeed both. If we can entertain and edify you in equal measure and make you look forward to the next issue of 'MAM' then we will be succeeding. Until next month. AM

Neil Robinson
Editor, Model Aircraft Monthly

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David James describes the operational service of the RAF's first four-engined heavy bombers, whilst *Jon Freeman* provides four pages of colour schemes

20 Royal Flying Corps
Colours and markings
Following years researching this project, *Paul Lloyd* shares some of his findings about recreating the surface finishes applied to British Military aircraft of the 1914–1918 War

36 Camouflage & Markings:
Mosquito PR Mk I and B Mk IV series (i)
Paul Lucas describes the colour schemes and markings of the first, short-nacelled Mosquitoes to enter RAF service, whilst *Jon Freeman* provides colour illustrations of their non-standard finishes

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34 Mosquito
PR Mk I/B Mk IV series (i) General Arrangement drawings by *Mark Rolfe*



Cover – Bombing-Up
© IWM (TR 36)
A bomb-train of 250lb bombs arriving to be loaded into Short Stirling bomber N6101 of No 1651 Heavy Conversion Unit, 29 April 1942, Waterbeach, Cambridgeshire

modelling

46 'Wooden Wonder'
John McIllmurray builds the first Mosquito PR Mk I to enter RAF service using the exclusive to MAM readers, 1/72 scale, resin conversion set. **See p50 to obtain this exclusive set**



52 Daguet Jaguar
MAM's new editor, *Neil Robinson*, briefly describes the part played by *Armée de l'Air* Jaguars in the 1991 Gulf war, and keeps his modelling hand in by building a 1/48 scale Heller Jaguar

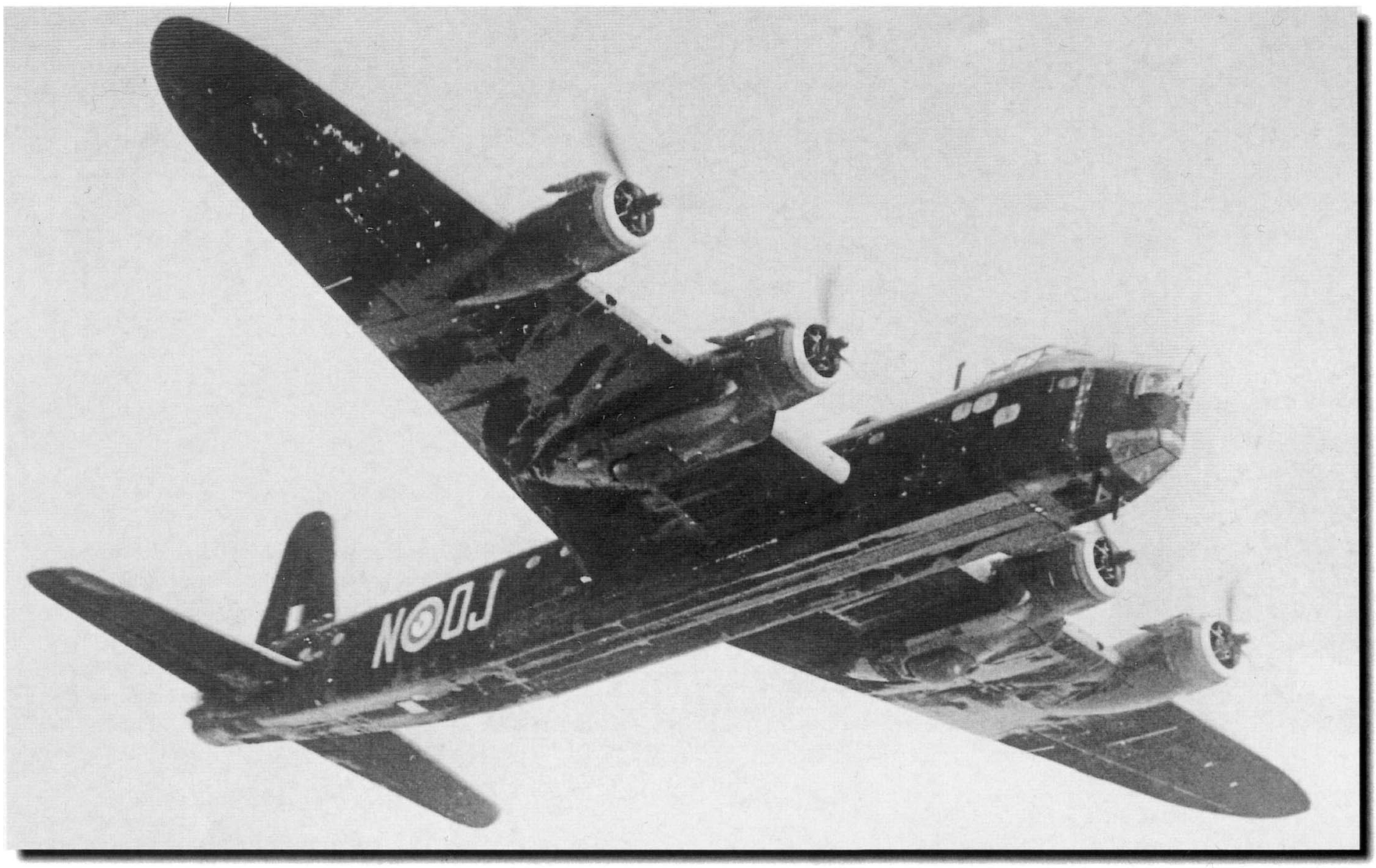
regulars

30 Forum NEW!
Your opportunity to voice your opinion, ask questions, respond to previous articles, offer information, or simply write in with topics of interest

62 Showtime NEW!
The new monthly round-up of events, air displays and model shows - worldwide!

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Our new, expanded coverage of the latest aviation book releases

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First of the RAF's Heavies

Short Stirling

Designed in response to the ominous expansion of the German Luftwaffe during the 1930s, the Short Stirling was the first four-engined, monoplane heavy bomber to see service with the Royal Air Force when it became operational during the summer of 1940, as David James describes in this brief look at the first of the RAF's heavies

UNIQUE IN A NUMBER OF WAYS, THE STIRLING WAS apparently well liked by those who flew it due to its good manoeuvreability, sturdy construction and ability to sustain considerable amounts of battle damage.

However its flight performance and bomb carrying capacity left much to be desired thanks to the short-sighted requirements laid down by the Air Ministry, so the Stirling was later overshadowed by its rivals, the Handley Page Halifax and the Avro Lancaster. Consequently the Stirling's time as a bomber was relatively short but it went on to forge a new career for itself as a glider tug, transport and specialist warfare platform, even seeing some limited post-war use as a civilian airliner.

Into service

Deliveries to the RAF of the first production standard aircraft from Short Brothers, designated as Stirling Mk Is, began slowly during the late summer of 1940 as the aviation industry devoted itself to churning out sorely needed Hurricane and Spitfire fighters to defend the country against the might of the *Luftwaffe* throughout the desperate days of the Battle of Britain. The supply of Stirlings was also hampered by the fact that the Germans raided Rochester and destroyed half a dozen newly completed airframes as they stood ready for delivery. A similar attack on Belfast later on wiped-out another five.

Despite these setbacks, Short Brothers managed to hand

over six Stirling Mk Is by August 1940 and these were used to form the nucleus of RAF Bomber Command's first four-engined heavy bomber unit, No 7 Squadron. Based initially at Leeming in Yorkshire, this squadron had previously operated the Vickers Wellington but under the guidance of Wing Commander P Harris, it quickly set about converting over to the much bigger Stirling. With a German invasion of Britain a distinct possibility during September 1940, the squadron was put on standby ready for use in bombing any enemy beachheads in Southern England. However the threat of invasion slowly faded once it became clear that the *Luftwaffe* had failed in its task of gaining air superiority over the RAF, so No 7 Sqn quietly resumed its normal working-up routines.

During October 1940 the first Belfast-assembled Stirling Mk I, N6000, took to the air and later that month No 7 Squadron relocated to Oakington in Cambridgeshire where in January 1941 it was visited by King George VI and Queen Elizabeth. The Stirling's combat debut though had to wait until the night of 10/11 February 1941, when three aircraft from No 7 Squadron, N3641, N3642 and N3644, joined a Bomber Command raid on the oil storage facilities around Rotterdam in the Netherlands.This was considered a moderately easy way of introducing the Stirling onto operations due to the limited nature of German anti-aircraft defences over that part of Rotterdam and the lack of patrolling enemy fighters. The three aircraft involved were led by Squadron Leader J M Griffiths-Jones and they successfully dropped a total of fifty-six 500lb bombs over the target before returning safely back to base.

After the success of this opening sortie, No 7 Sqn found itself in action over the French port of Brest where the German battlecruisers *Scharnhorst* and *Gneisenau* were known to be sheltering. These attacks were conducted at night and for the first time the Stirling came up against heavy enemy Anti-Aircraft Artillery (AAA) or Flak as it was popularly known in those days. Neither German warship was sunk during these raids but No 7 Sqn did at one point claim to have seriously damaged the *Scharnhorst*.

In April 1941, No 15 Squadron exchanged its Wellingtons for Stirling Mk Is and under the command of Wing Commander H R Dale, it took up residence at Wyton. Both Nos 7 and 15 Squadrons were then employed in a series of night attacks against a number of German cities including Cologne and Berlin. The first raid on the latter target by Stirlings took place during the night of 9/10 April when a trio of aircraft joined an eighty strong force heading for the German capital. One of the three Stirlings involved had to abort due to an engine fault whilst another diverted to bomb Emden instead, after being damaged by a *Luftwaffe* nightfighter. The third Stirling also failed to reach Berlin. It was shot down en route near the town of Lingen.

Due to its good manoeuvrability the Stirling was considered suitable for daylight bombing missions which were normally the preserve of the RAF's smaller, faster twin-engined bombers such as the Bristol Blenheim. Whilst night operations continued against Berlin and Brest, Nos 7 and 15 Squadrons also began conducting daylight attacks against North German coastal towns such as Emden or Kiel. These missions, which began on 27 April 1941, were undertaken without any fighter escort and so were always vulnerable to the *Luftwaffe's* interceptors. However the Stirling soon proved itself to be more than a handful to the enemy pilots and several German fighters were reportedly shot down by Stirling gunners. Even so casualties were inevitable on such dangerous sorties and both squadrons suffered losses.

Efforts to sink the *Scharnhorst* and *Gneisenau* continued into the summer of 1941, with Stirlings frequently bombing a number of French ports hoping to catch the two warships out. Aircraft from Nos 7 and 15 Squadrons were even called upon to help out in the hunt for the mighty German battleship the Bismarck during May 1941, after it had broken out into the Atlantic. Unfortunately the ship was never spotted despite regular Stirling patrols and No 15 Sqn suffered a particularly hard blow during this period when on 11 May, Wg Cdr Dale was shot down and taken prisoner. He was replaced as CO by Wg Cdr P B B Ogilvie.

The two squadrons' anti-shipping operations culminated on 23 July 1941, when half a dozen unescorted Stirlings struck the French harbour of La Pallice where the *Scharnhorst* was hiding out. Despite being intercepted by a number of enemy Bf 109 fighters the Stirlings managed to damage the battlecruiser with 2,000lb armour-piercing bombs, forcing it to limp back to Brest for repairs. As an extra bonus the Stirlings managed to shoot down two German fighters and damage a third, although at a cost of one of their own number being destroyed.

Towards the end of these missions some Stirlings began carrying specialists from No 109 Squadron. These men had been specially trained to operate the prototype version of the 'Trinity' blind-bombing system and an early model of the 'Oboe' navigational aid. Using Stirlings modified with this equipment No 109's crews were able to perfect the operational use of both 'Trinity' and 'Oboe' prior to them being adopted throughout Bomber Command during 1942.

Meanwhile production of the Stirling Mk I was stepped up at both Rochester and Belfast with Austin Motors at Longbridge also joining in. Individual Stirling components were built by dozens of firms up and down Britain on a sub-contract basis from Short Brothers, before being delivered to the three main works for final assembly. To defend itself against enemy fighters the Stirling was first equipped with twin 0.303 inch Browning machine guns mounted in a Frazer-Nash designed nose turret. Another four 0.303 inch Brownings were carried in a Frazer-Nash FN20A tail turret. A retractable ventral turret housing was also installed complete with two more 0.303 inch machine guns. This feature though proved unpopular due to its



All photographs via David James except where stated

OPPOSITE Stirling Mk I, OJ•N of No 149 Squadron in flight. This unit converted to Stirlings at Mildenhall during November 1941 and went on to fly the most number of combat sorties with the type across the whole of RAF Bomber Command. Note the weathering under the wings and rear fuselage

ABOVE Short Stirling Mk I, W7459, 'O' of No 1651 Heavy Conversion Unit. This particular aircraft was one of many Stirlings produced by the Austin Motor Company Limited at its Longbridge factory close to Birmingham. Note the twin tailwheels. (Credit: The Rover Group)



cramped conditions and as it extended it created an enormous amount of drag on the aircraft. It wasn't long therefore before production standard Stirlings began appearing minus the ventral turret but sporting two pivot-mounted machine guns which were designed to fire through beam hatches in the fuselage sides. This also proved unacceptable and as Stirling production got into its stride the pivot-mounted guns gave way to an FN7 dorsal turret equipped with twin Brownings. This had already been proven on the Avro Manchester twin-engine bomber and was a vast improvement.

Newer Stirlings began entering service with the FN7 dorsal turret and some also began employing uprated Bristol Hercules XI engines. Capable of 1,500 horsepower each, these new engines were fitted with two-stage superchargers to enhance their performance and used welded-steel tubular mountings which made them far easier to remove by ground crews for servicing or repairs.

Fitted with a double-row, fourteen-cylinder arrangement, the Hercules XI also introduced a new hydraulic throttle control system. This though was far from efficient as there was a significant time delay between the pilot activating the Stirling's throttle levers and its engines responding to the new commands. By the time they did and the increased or decreased power filtered through it was often too late!

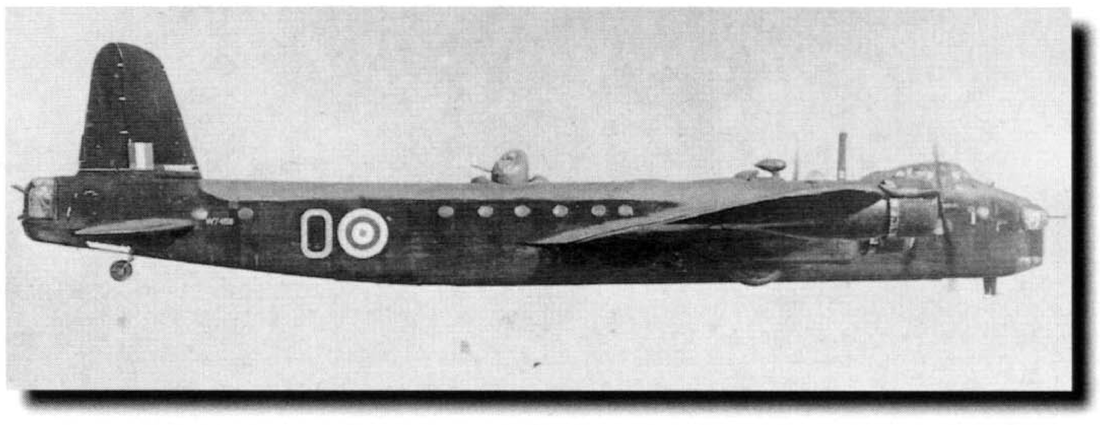
Over the Alps

Nazi Germany's success against the Allies during the summer of 1940 prompted Italy's Fascist regime to jump on the bandwagon by declaring war against both Britain and France on 10 June. The RAF's response to this move was immediate. On the night of 11/12 June, a force of Wellingtons and Whitleys was sent out to bomb the Northern Italian cities of Turin and Genoa. Although operating at extreme range and only carrying a small bomb load this force managed to cause some damage to Italy's war production machine and severely dented the morale of the ordinary Italian citizen.

The entry into service of the Stirling immediately gave Bomber Command a far more suitable bomber for striking against Italy. Even so, despite the Stirling's range, the key industrial targets of Milan and Turin or the big naval base at La Spezia were still at the upper limits of its combat radius. To safely reach such objectives and return home again the Stirlings had to carry their maximum fuel loads although this meant a reduction in the number of bombs on board.

However the weight of such a heavy fuel load meant that the Stirling was unable to climb above the Alps as it headed towards Italy where the tallest mountains peaked at 16,000 feet. Thus the crews were faced with the daunting prospect of having to pick their way at night through the mountains one peak at a time or navigate their way along tortuous, twisting Alpine valleys. Such missions would clearly be extremely tiring for the crews involved and would also test their flying skills to the limit as the Alps were full of dangers. The risk of losing one or more engines was ever present and everybody knew that the Stirling was unable to maintain its altitude once its engines began to fail. Over the Alps such a mechanical failure was potentially catastrophic and was more than likely to result in the bomber crashing in to the side of a mountain. Also the weather was particularly unpredictable in that part of Europe. Sudden, powerful up drafts of wind were a real threat and could easily lead to a Pilot losing control of his aircraft. Ice was ever present as were blankets of rain. Cloud or fog proved especially hazardous as it often shrouded the highest summits or covered the Alpine passes thus leading to crashes or navigational errors. To fly around such treacherous weather conditions was virtually impossible, as that meant using up too much fuel so the Stirling would never get back to its base again.

However, the RAF didn't have much alternative but to fly across the Alps. Although it could have sent its bombers to the



TOP This Rochester-built Stirling Mk I, N6090, saw service with Nos 7 and 15 Squadrons and the A&AEE prior to it being written off in an accident in April 1942. This view illustrates, to good effect, the Stirling's enormous height and rather rakish posture when on the ground

ABOVE Another airborne view of Stirling Mk I, W7459. Although later overshadowed by the Avro Lancaster and Handley Page Halifax, the Stirling made an important contribution to the RAF's heavy bomber offensive during the middle years of the Second World War

OPPOSITE A brand new Belfast-built, Short & Harland, Stirling Mk III, serial number BF509, flies over the English countryside probably on its delivery test flight. Entering service late in 1942, the Stirling Mk III was the definitive bomber variant and featured up-rated Bristol Hercules XVI engines plus a revised Frazer-Nash FN50 dorsal gun turret

west of the mountains across Southern France before skirting around Lake Geneva to cross into Italy, this was a longer route and used up too much fuel whilst at the same time leaving the aircraft much more exposed to enemy, (both German and supposedly neutral Vichy French), AAA batteries or nightfighters throughout France.

Regardless of the risks involved in such missions, the RAF's Stirling squadrons were soon committed to action against the Italians. During the night of 10/11 September 1941 a number of aircraft from Nos 7 and 15 Squadrons participated in a seventy-six strong raid against Turin. From that date onwards the cities of Northern Italy became a regular target for the Stirling.

Stirling expansion

During November 1941, a third Bomber Command unit, No 149 Squadron based at Mildenhall began operating Stirlings. Commanded at first by Wg Cdr G J Spence, this squadron later went on to fly the most number of Stirling missions of any RAF unit during the Second World War. By the time it relinquished its Stirlings in September 1944, No 149 Sqn had undertaken 2,628 sorties for the loss of eighty-seven aircraft in action with another forty written off in accidents. By the close of 1941, the production rate for Stirlings had soared to twenty a month and this allowed Bomber Command to start re-equipping a number of other squadrons during 1942, commencing with No 218 Squadron.

From the beginning of the Stirling programme, the RAF had been concerned that during any prolonged war with Germany the supply of Hercules engines from Bristol might dry up, thus leaving its new bomber without a suitable powerplant. To guard against this possibility, the British Government drafted a scheme to build the Stirling overseas - in Canada using alternative 1,600 hp Wright R-2600-A5B Cyclone engines. A total of 140 aircraft were planned under the designation Stirling Mk II and to test out the new engines a trio of prototypes, N3640, N3657 and N3711, were assembled in Britain during 1941 prior to Canadian production starting. However by the beginning of 1942 it was obvious to the RAF that there would be a plentiful supply of Hercules engines so the contract for the Stirling Mk II was cancelled. The three existing prototypes continued in their existing configurations for some time but two of them were later converted back into Stirling Mk Is.

As 1942 progressed the RAF's Stirlings began probing deeper into occupied Europe on long-range bombing sorties. As well as regularly attacking targets in Northern Italy, Stirlings also began bombing key armament facilities in Eastern Europe such as the Skoda factory at Pilsen in Czechoslovakia. To improve mission effectiveness on such high endurance flights an increasing number of Stirlings began to receive 'Gee', the radio/navigation/target-identification device, from March 1942. This piece of equipment greatly enhanced the Stirling's ability to deliver its bombs accurately on to their intended target.

This improvement was later put to the test when Bomber Command launched a major new campaign against vital German industrial and weapons manufacturing facilities. Although only in service with four squadrons, (a fifth, No 214 Squadron, became operational during April 1942), the Stirling made an important contribution to this offensive. This importance was fully demonstrated during the night of 30/31 May 1942, when 'Gee' equipped Stirlings helped lead the RAF's first 1,000 bomber raid on the German city of Cologne.

Using their 'Gee' devices to accurately navigate a course, the Stirlings then used the light of the moon to drop incendiary bombs across Cologne which ignited a number of fires. The glow from these raging infernos was used by the rest of the RAF bombing force to guide them on to their targets. The attack, a major propaganda success for the RAF and a vital morale boost for Bomber Command, destroyed 600 acres of the German city and inspired two more 1,000 bomber raids later that year against Essen and Bremen.

During August 1942, the pioneer Stirling unit, No 7 Sqn., relinquished its main bombing duties to join the RAF's new Pathfinder Force, (PFF), which had been set up in the wake of the Cologne raid. The PFF was dedicated to target-marking key objectives for Bomber Command's squadrons to improve mission accuracy and as such PFF units were required to use advanced navigational skills, map-reading and technical aids such as 'Gee' or 'Oboe'. Having accurately plotted a course to their target the PFF squadrons were then required to illuminate it using flares and incendiary devices for the following bomber formations.

The definitive bomber

By the end of 1942, Nos 75 (New Zealand) and 90 Squadrons had both been re-equipped with the Stirling. As neither the Halifax nor the Lancaster was yet in widespread service, the brunt of the RAF's strategic bombing campaign was being borne by the Stirling with support from twin-engined Wellingtons or Manchesters along with diminishing numbers of Whitleys and Hampdens.

Late 1942 also saw the RAF begin to receive the improved Stirling Mk III variant. This was the definitive bomber version to see service during the Second World War and was fitted with uprated 1,635hp Bristol Hercules XVI engines. These were installed via the 'power egg' arrangement which saw the Her-





cules and its mountings built as one complete self-contained unit, which was much easier to work on for maintenance purposes and could quickly be removed at an airfield by ground crews. The Hercules XVI also came complete with an under slung 12-inch oil cooler unit for improved efficiency.

The Stirling Mk III also incorporated the revised Frazer-Nash FN50 dorsal turret with twin 0.303 inch machine guns as standard. These turrets were also employed by the Avro Lancaster and had replaced the FN7 model on some of the final delivery Stirling Mk Is. The Stirling Mk III also featured enlarged fuel tanks, a revised cabin interior and fewer oval shaped windows along its rear fuselage.

Austin Motors at Longbridge assembled the first two Stirling Mk III prototypes, BK648 and BK649, whilst the last pair of Stirling Mk Is on the production line, R1988 and R9309, were completed to the revised specifications before being delivered. Most of the early Mk IIIs went to existing Stirling squadrons where they first operated alongside, then eventually replaced, the remaining Stirling Mk Is. However during 1943, Bomber Command also re-equipped Nos 196 and 199 Squadrons with Stirling Mk IIIs followed by No 620 Sqn at Chedburgh whilst in August of the same year, two more units, Nos 622 and 623 Squadrons formed up. In September 1943 No 513 Squadron at Witchford also converted to Stirling Mk IIIs.

From the start of 1943, a number of Bomber Command Stirlings had begun to be fitted with the brand new, top secret H2S navigation and target-identification radar system. This highly advanced piece of equipment was first used operationally on the Stirling when No 7 Sqn successfully target-marked parts of Hamburg on the night of 30/31 January 1943. However the radar's secrets were soon unravelled by the Germans when a month later one of No 7 Squadron's aircraft was shot down over the Netherlands. Despite this setback the H2S remained an extremely valuable device and was to continue in use with the RAF for many years.

The Battle of the Ruhr

From March 1943, Bomber Command had begun waging a sustained campaign against the Nazi's industrial and armament factories that were concentrated in the Ruhr Valley region of Western Germany. Aware of this area's vital importance to their war efforts, the Germans had strongly fortified it with countless searchlights and masses of AAA batteries. Large numbers of nightfighters roamed the skies above, ever eager to hunt out British bombers.

Despite this fearsome opposition, Bomber Command launched thirty-one major raids against the Ruhr up to July 1943, with the Stirling playing a prominent role in these attacks alongside increasing numbers of Halifaxes and Lancasters. Key towns and cities such as Dusseldorf, Gelsenkirchen, Bottrop, Essen, Oberhausen, Duisberg, Munchen-Gladbach and Mulheim suffered heavy damage during the British offensive but in return the RAF lost 981 aircraft along with the lives of 4,171 crewmen. A further 1,347 men were reported missing in action although most of these were later confirmed as being prisoners-of-war.

The Ruhr campaign, although generally successful, did not shorten the war and Germany's industrial output later recovered from the battering it had taken. It had however established that the Stirling was becoming increasingly vulnerable to heavy calibre anti-aircraft guns despite its sturdy construction. Unable to fly higher where it would be much safer from such defences, the Stirling began to pay an increasingly high price.

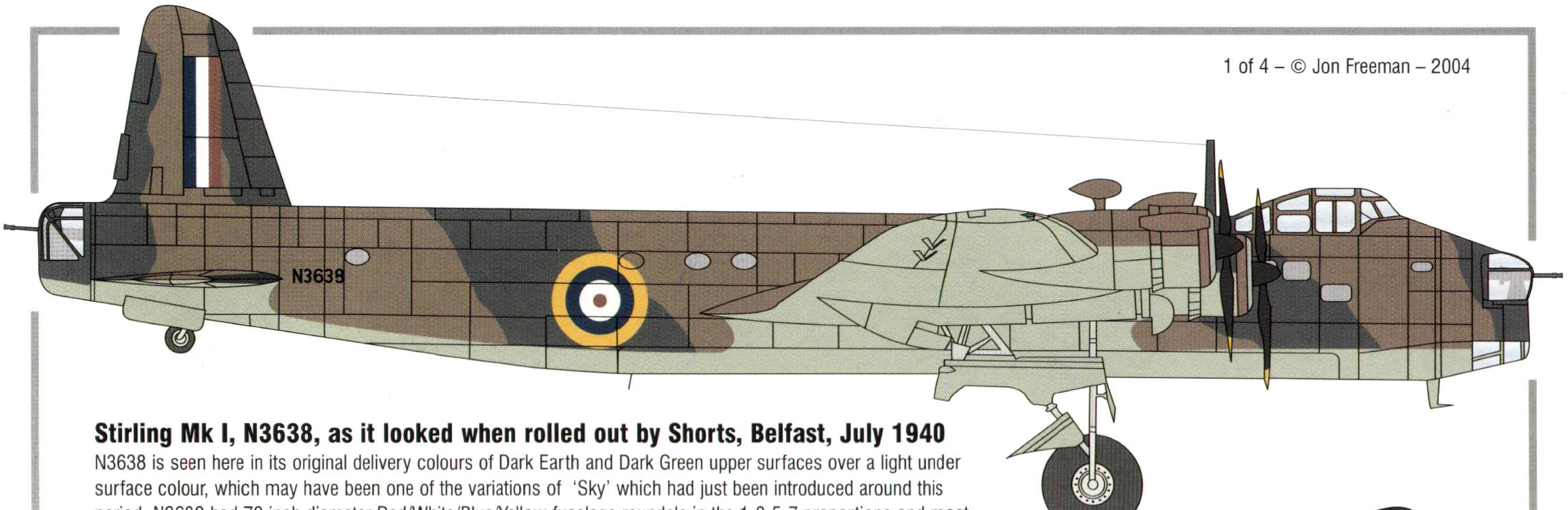
There was also another risk to the Stirling from its own side. Bombs dropped from higher flying Halifaxes or Lancasters were proving to be a particular danger to the Stirlings and several aircraft were lost as a result of bombs striking them as they fell earthwards. These weapons were themselves becoming much larger, for example the RAF had introduced a 24-inch diameter 4,000lb bomb, which was fine for the Halifax or Lancaster but was totally incompatible with the Stirling thanks to the type's restricted bomb bay design. Clearly the Stirling's operational effectiveness was beginning to suffer at the hands of technological advances and improved German defences.

Mission changes

After the close of the Battle of the Ruhr, the Stirling was gradually ousted from long-range bomber sorties over Germany by the Halifax and the Lancaster. Instead it concentrated upon hitting less heavily defended targets such as enemy airfields or V-1 Flying Bomb launcher sites throughout Northern France and the Low Countries. Industrial objectives outside of Germany such as those in Italy continued to receive regular Stirling attacks for some while.

However a new mission for Bomber Command's Stirlings emerged during 1943. Airborne sowing of anti-shipping mines in enemy coastal waters had been undertaken by the RAF ever since the Second World War began and was viewed as a useful means of disrupting enemy shipping and supply movements. It was in this important role that the RAF's Stirlings found increasing employment.

TOP EF427, a Rochester-built Stirling Mk III, awaiting delivery to an operational squadron in the summer of 1942. Note the National marking III fuselage roundels and fin flash dating this photograph to post-May 1942



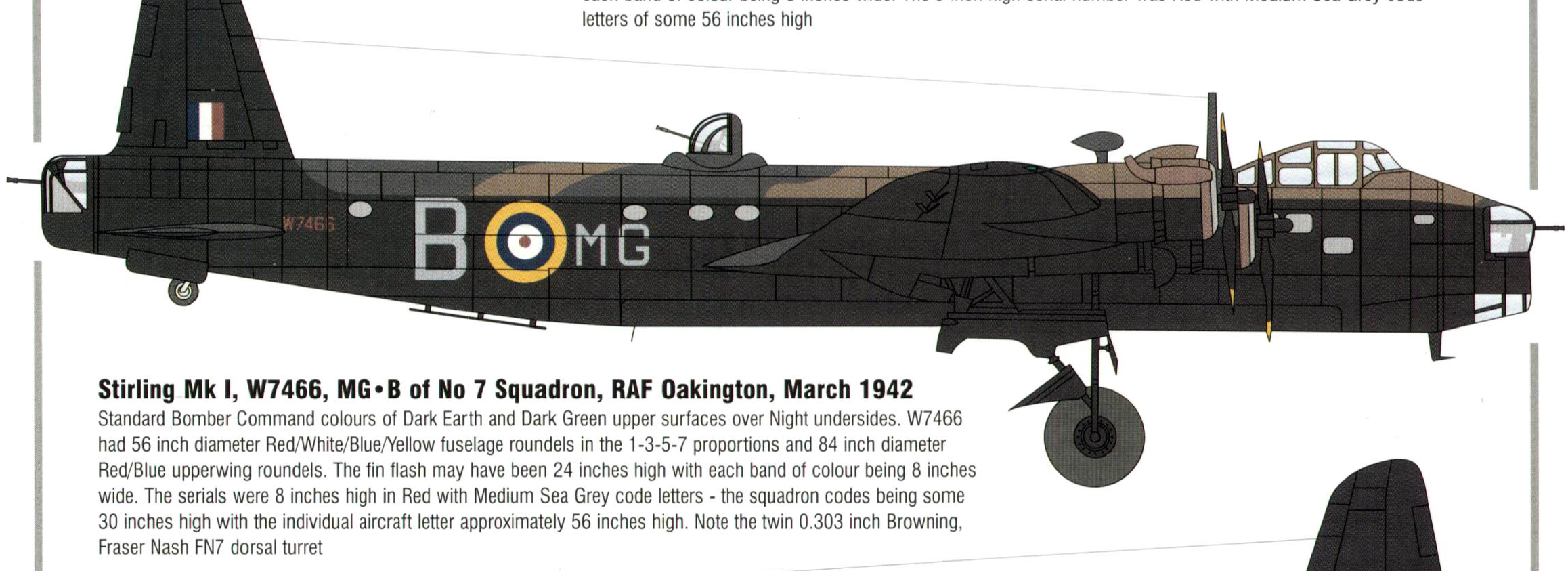
Stirling Mk I, N3638, as it looked when rolled out by Shorts, Belfast, July 1940

N3638 is seen here in its original delivery colours of Dark Earth and Dark Green upper surfaces over a light under surface colour, which may have been one of the variations of 'Sky' which had just been introduced around this period. N3638 had 72 inch diameter Red/White/Blue/Yellow fuselage roundels in the 1-3-5-7 proportions and most likely had 84 inch diameter upperwing Red/Blue roundels. The fin flash may have been 78 inches high with each Red/White/Blue band being 8 inches wide. The serials were Night and most likely 8inches high



Stirling Mk I, W7442, MG•M of No 7 Squadron, RAF Oakington, October 1941

Showing the standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides, W7442 had 56 inch diameter Red/White/Blue/Yellow fuselage roundels in the 1-3-5-7 proportions and 84 inch diameter Red/Blue upperwing roundels. The Red/White/Blue fin flash may have been 24 inches high with each band of colour being 8 inches wide. The 8 inch high serial number was Red with Medium Sea Grey code letters of some 56 inches high



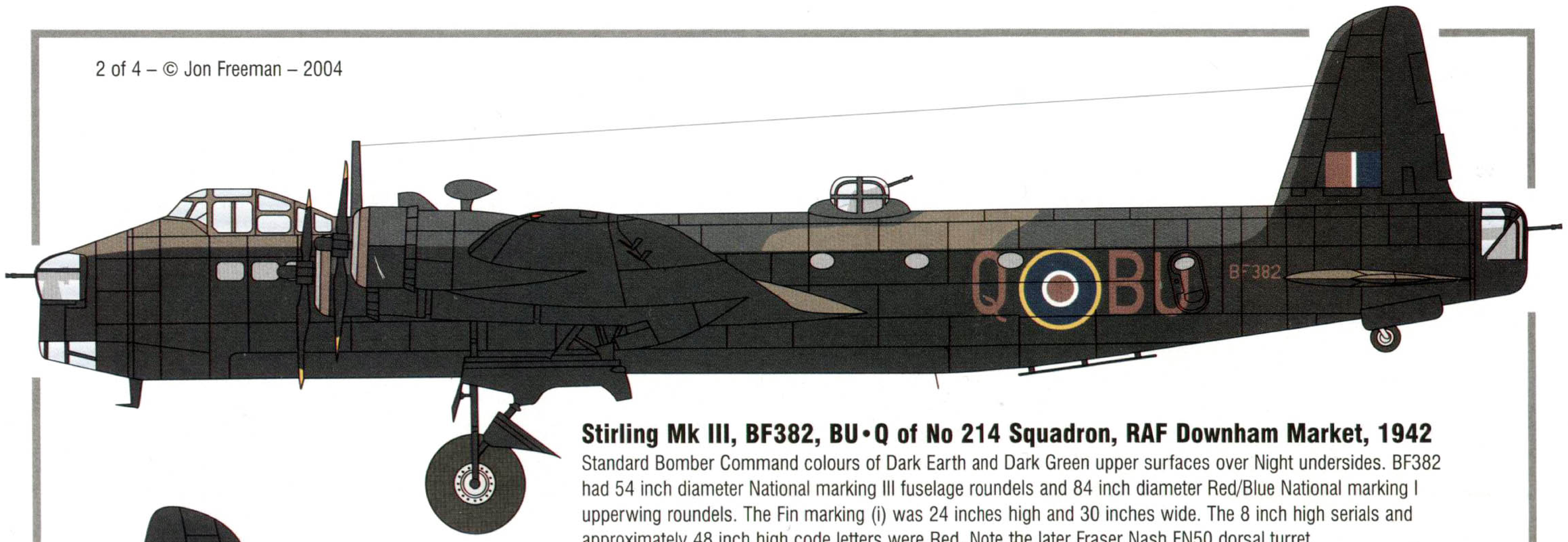
Stirling Mk I, W7466, MG•B of No 7 Squadron, RAF Oakington, March 1942

Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. W7466 had 56 inch diameter Red/White/Blue/Yellow fuselage roundels in the 1-3-5-7 proportions and 84 inch diameter Red/Blue upperwing roundels. The fin flash may have been 24 inches high with each band of colour being 8 inches wide. The serials were 8 inches high in Red with Medium Sea Grey code letters - the squadron codes being some 30 inches high with the individual aircraft letter approximately 56 inches high. Note the twin 0.303 inch Browning, Fraser Nash FN7 dorsal turret

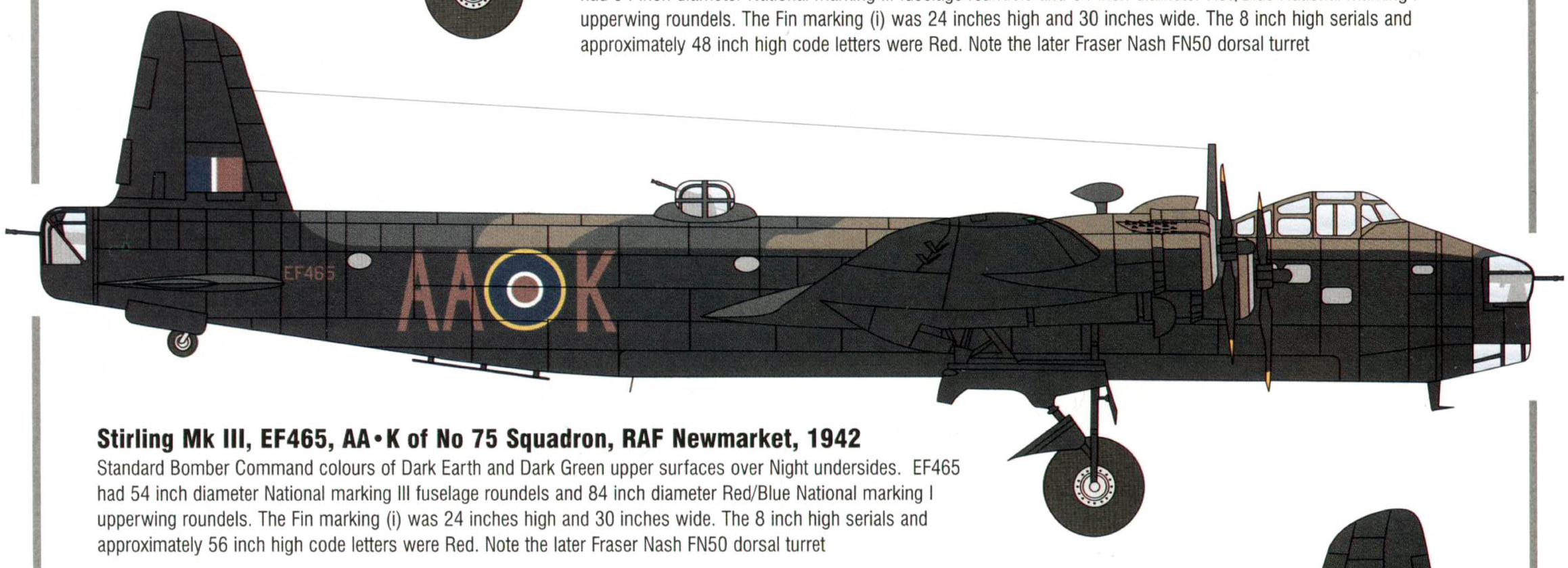


Stirling Mk I, N3676, 'S' of No 1651 Conversion Unit/No 15 Squadron Conversion Flight, RAF Waterbeach, July 1942

Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. N3676 had 56 inch diameter Red/White/Blue/Yellow fuselage roundels in the 1-3-5-7 proportions and 84 inch diameter Red/Blue upperwing roundels. The fin flash may have been 24 inches high with each band of colour being 8 inches wide. The serials were 8 inches high in Red. The individual aircraft letter 'S' is in Medium Sea Grey and is approximately 56 inches high. Note the FN7 dorsal turret and the overpainted No 15 Squadron codes

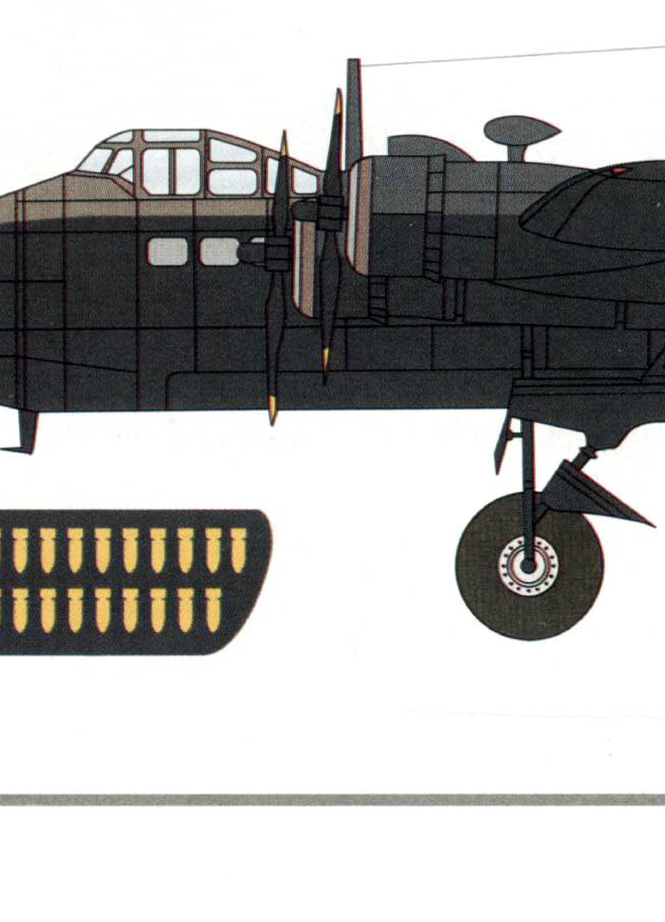


Stirling Mk III, BF382, BU•Q of No 214 Squadron, RAF Downham Market, 1942
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. BF382 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 48 inch high code letters were Red. Note the later Fraser Nash FN50 dorsal turret



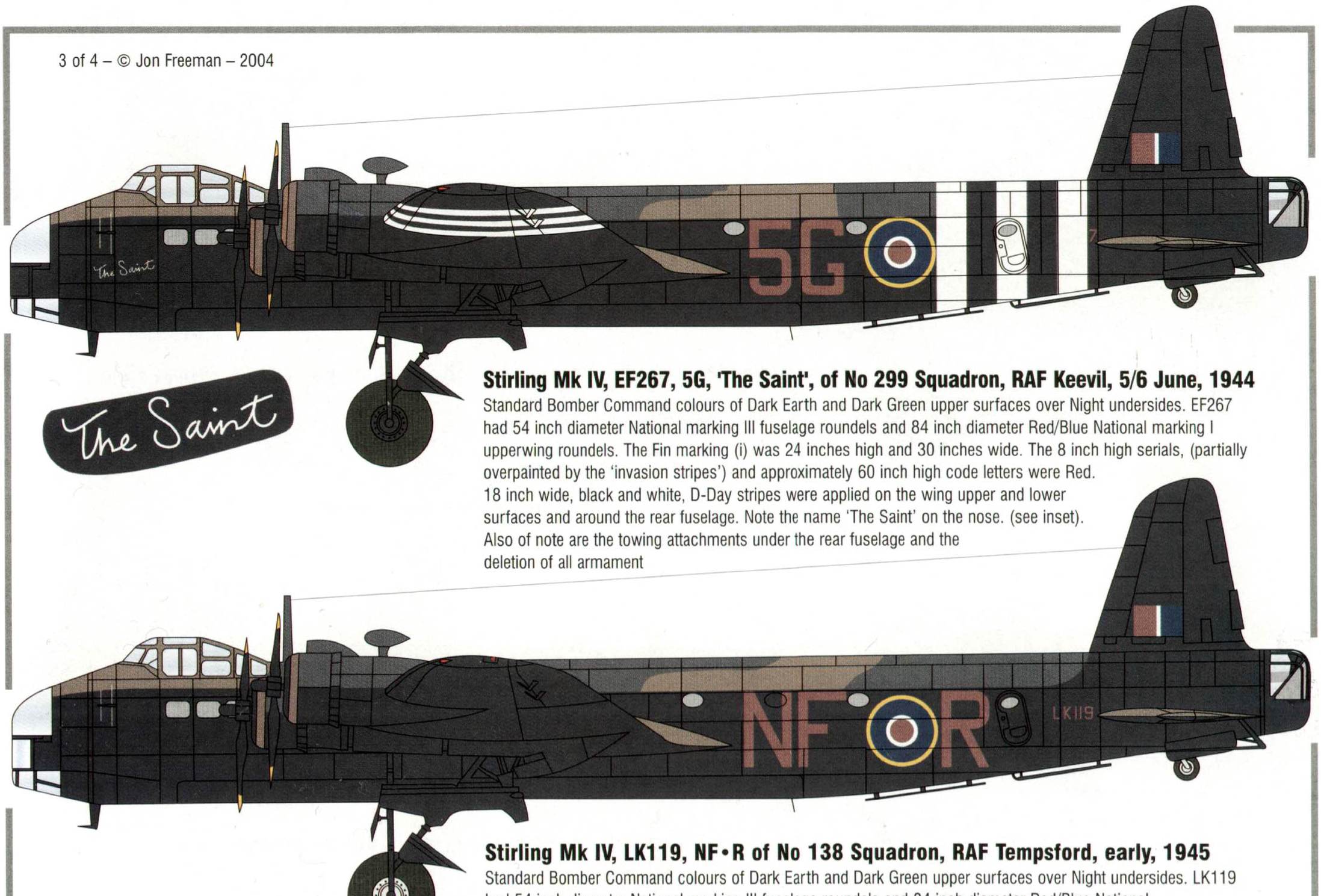
Stirling Mk III, EF465, AA•K of No 75 Squadron, RAF Newmarket, 1942
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. EF465 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 56 inch high code letters were Red. Note the later Fraser Nash FN50 dorsal turret





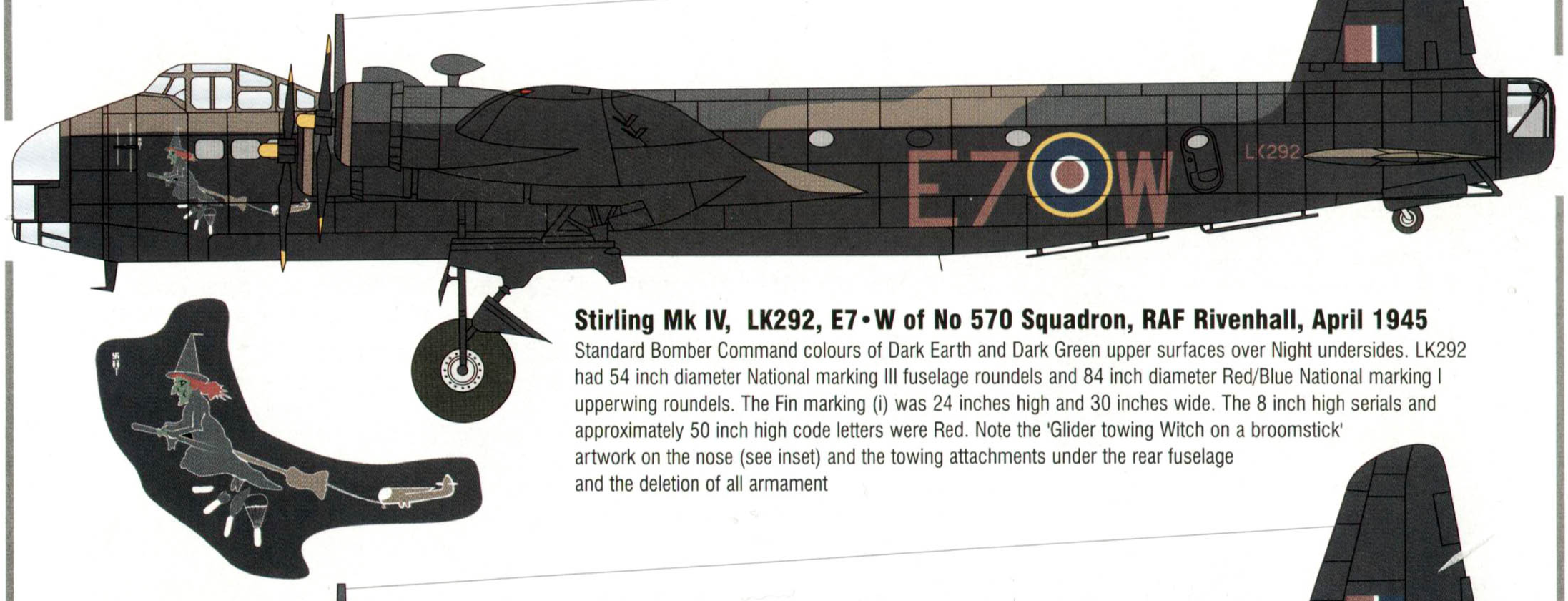
Stirling Mk III, EF411, OJ•K of No 149 Squadron, RAF Mildenhall, April 1942
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. EF411 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 50 inch high code letters were Red. Note the white 'bomb' tally markings near to the crew access door. (see inset). EF411 completed at least sixty-nine operations before being passed on to No 1653 Heavy Conversion Unit (HCU)

Stirling Mk III, LK516, WB•J of No 90 Squadron, RAF Tuddenham, 1944
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. LK516 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 50 inch high code letters were Red. Note the nineteen yellow 'bomb' tally markings near the crew access door, (see inset)

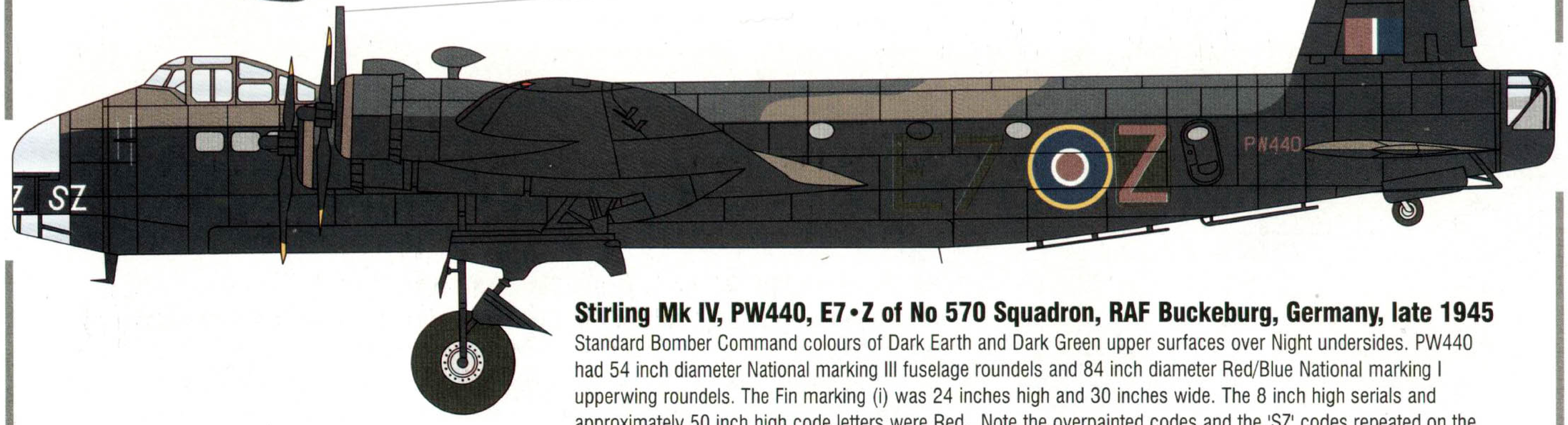


Stirling Mk IV, EF267, 5G, 'The Saint', of No 299 Squadron, RAF Keevil, 5/6 June, 1944
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. EF267 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials, (partially overpainted by the 'invasion stripes') and approximately 60 inch high code letters were Red. 18 inch wide, black and white, D-Day stripes were applied on the wing upper and lower surfaces and around the rear fuselage. Note the name 'The Saint' on the nose. (see inset). Also of note are the towing attachments under the rear fuselage and the deletion of all armament

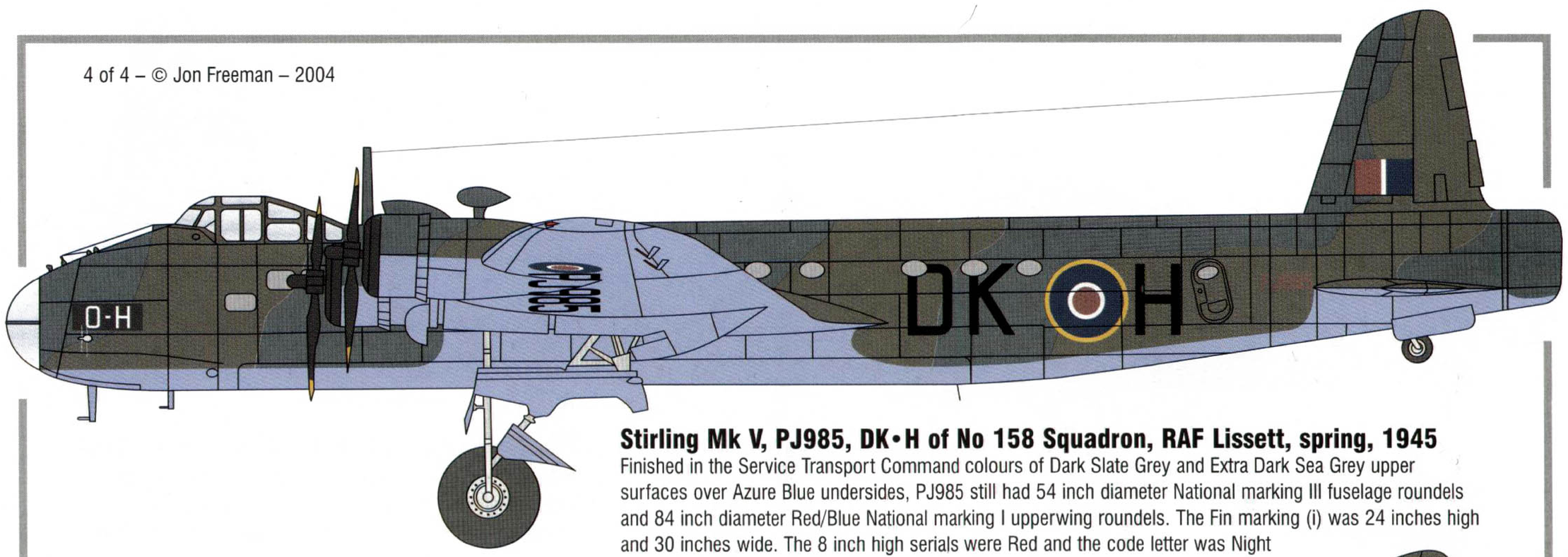
Stirling Mk IV, LK119, NF•R of No 138 Squadron, RAF Tempsford, early, 1945
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. LK119 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 54 inch high code letters were Red. This aircraft was later tasked with SOE operations over Norway where it was lost along with its entire crew



Stirling Mk IV, LK292, E7•W of No 570 Squadron, RAF Rivenhall, April 1945
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. LK292 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 50 inch high code letters were Red. Note the 'Glider towing Witch on a broomstick' artwork on the nose (see inset) and the towing attachments under the rear fuselage and the deletion of all armament

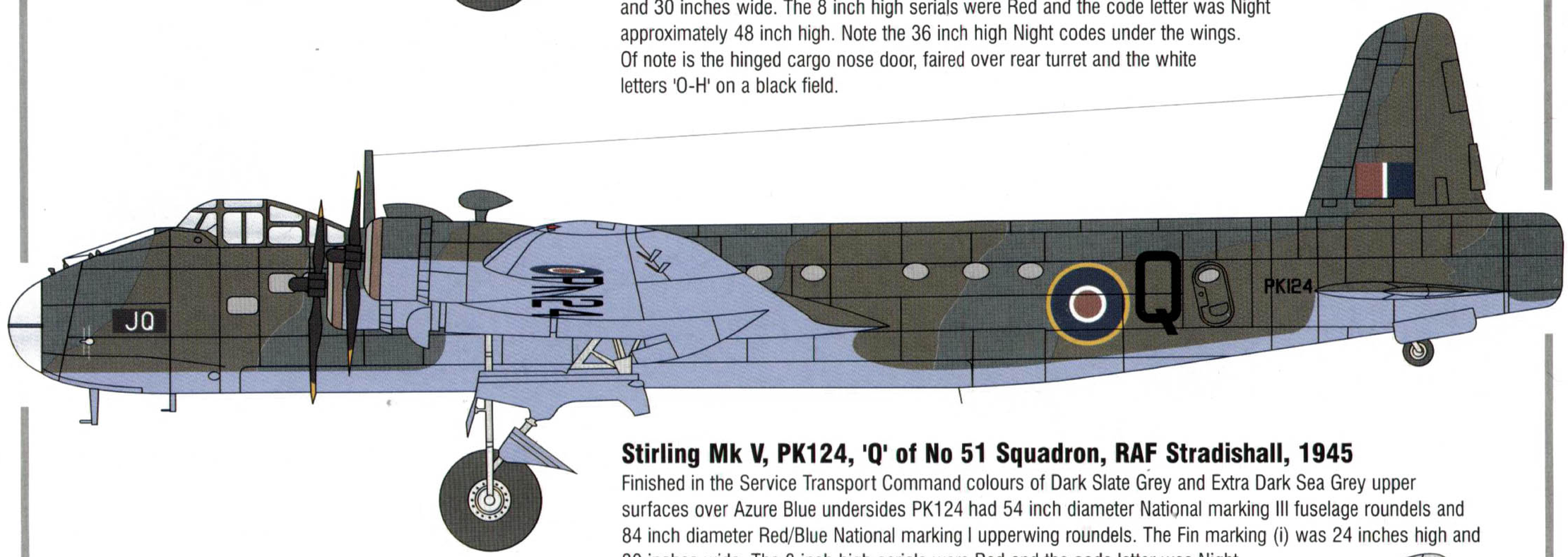


Stirling Mk IV, PW440, E7•Z of No 570 Squadron, RAF Buckeburg, Germany, late 1945
Standard Bomber Command colours of Dark Earth and Dark Green upper surfaces over Night undersides. PW440 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials and approximately 50 inch high code letters were Red. Note the overpainted codes and the 'SZ' codes repeated on the nose in white. Also of note are the towing attachments under the rear fuselage and the deletion of all armament



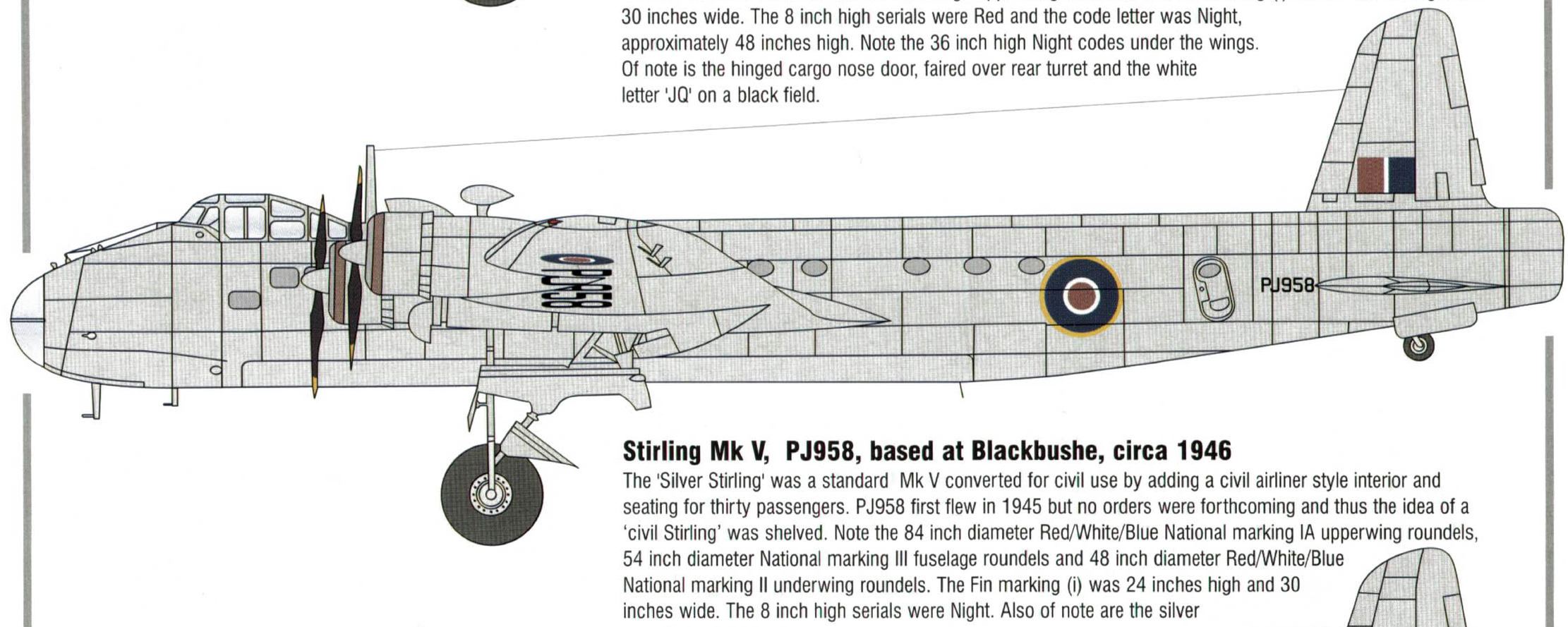
Stirling Mk V, PJ985, DK•H of No 158 Squadron, RAF Lissett, spring, 1945

Finished in the Service Transport Command colours of Dark Slate Grey and Extra Dark Sea Grey upper surfaces over Azure Blue undersides, PJ985 still had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials were Red and the code letter was Night approximately 48 inch high. Note the 36 inch high Night codes under the wings. Of note is the hinged cargo nose door, faired over rear turret and the white letters 'O-H' on a black field.



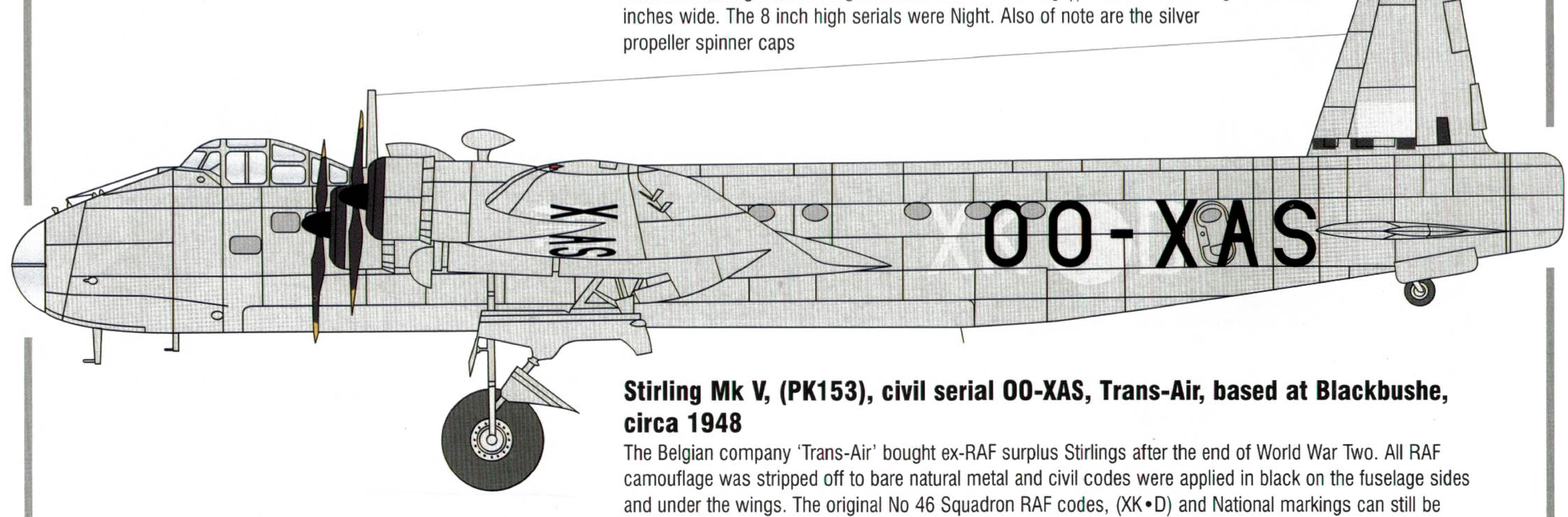
Stirling Mk V, PK124, 'Q' of No 51 Squadron, RAF Stradishall, 1945

Finished in the Service Transport Command colours of Dark Slate Grey and Extra Dark Sea Grey upper surfaces over Azure Blue undersides PK124 had 54 inch diameter National marking III fuselage roundels and 84 inch diameter Red/Blue National marking I upperwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials were Red and the code letter was Night, approximately 48 inches high. Note the 36 inch high Night codes under the wings. Of note is the hinged cargo nose door, faired over rear turret and the white letter 'JQ' on a black field.



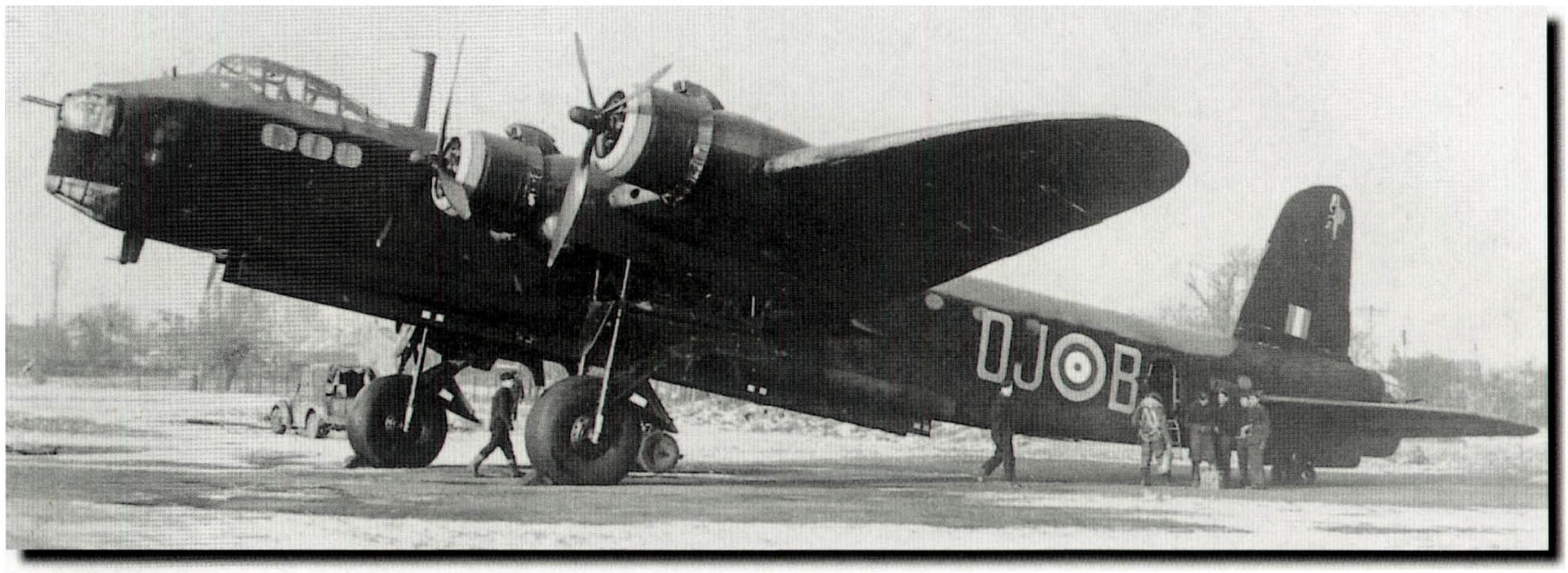
Stirling Mk V, PJ958, based at Blackbushe, circa 1946

The 'Silver Stirling' was a standard Mk V converted for civil use by adding a civil airliner style interior and seating for thirty passengers. PJ958 first flew in 1945 but no orders were forthcoming and thus the idea of a 'civil Stirling' was shelved. Note the 84 inch diameter Red/White/Blue National marking IA upperwing roundels, 54 inch diameter National marking III fuselage roundels and 48 inch diameter Red/White/Blue National marking II underwing roundels. The Fin marking (i) was 24 inches high and 30 inches wide. The 8 inch high serials were Night. Also of note are the silver propeller spinner caps



Stirling Mk V, (PK153), civil serial OO-XAS, Trans-Air, based at Blackbushe, circa 1948

The Belgian company 'Trans-Air' bought ex-RAF surplus Stirlings after the end of World War Two. All RAF camouflage was stripped off to bare natural metal and civil codes were applied in black on the fuselage sides and under the wings. The original No 46 Squadron RAF codes, (XK•D) and National markings can still be discerned beneath the civil codes. Also of note are the black propeller spinner caps



During the early years of the war the airborne laying of mines required the launcher aircraft to fly at low-levels so that the mines wouldn't disintegrate upon hitting the sea. Flying so low naturally put the aircraft at risk from enemy coastal AAA batteries or specially equipped flak ships which patrolled the shoreline while nightfighters remained an ever present danger. However although risky, flying at lower altitudes suited the Stirling perfectly. Throughout late 1943 and into 1944, the Stirling frequently undertook mining operations across the Channel, the North Sea and out into the Atlantic. Even when the RAF introduced stronger parachutes and improved casings for its mines which allowed them to be dropped from higher altitudes which thus reduced the dangers from flak, the Stirling continued to perform the role with aplomb. The use of H2S radar even allowed the Stirlings to accurately plot where to drop their mines from high-altitude so making the entire operation much more effective.

Also, from late 1943, the Stirlings of Nos 149 and 199 Squadrons began undertaking long-range aerial re-supply flights to various Resistance groups operating across occupied Europe. Such missions, supplying everything from food parcels to ammunition, explosives to radio sets, small arms to medicines, would later become one of the Stirling's principal duties during the final years of the war.

Bomber Command phase-out

As more and more Halifaxes and Lancasters were delivered to the RAF throughout late 1943, so Bomber Command was steadily able to replace its remaining Stirlings or 'cascade' them on to other operations. The first to go were the Pathfinders of No 7 Squadron who in August 1943 converted over to the Avro Lancaster. In November of that year No 196 Squadron transferred to RAF Transport Command's No 38 Group and began using its Stirlings as glider tugs - (see later).

The rundown continued with Nos 15, 75(NZ), 214, 513, 622 and 623 Squadrons all exchanging their Stirlings for either Halifaxes or Lancasters by April 1944. Meanwhile Nos 199 and 620 Squadrons left to join No 38 Group. With the imminent Allied invasion of France due during the summer of that year, Bomber Command's strategic operations were postponed and its squadrons were reassigned to bombing more tactical targets throughout Northern France and the Low Countries. These targets included railway marshalling yards or stations, airfields, radar sites, coastal defence fortifications, ports and harbours, troop concentrations, tank depots, oil storage facilities, key bridges, command centres and supply dumps. The aim of such attacks was to cripple the German Army's ability to respond to any invasion and also to confuse the Germans as to exactly where the planned landings would come ashore. Bomber Command's dwindling number of Stirling units participated fully in this campaign.

Even after the D-Day invasion had taken place in Normandy on 6 June 1944, Bomber Command was still required to support the advancing Allied ground forces. German reinforcements were flooding into France in an attempt to contain the British and American armies' beachheads, and to stop these troops reaching the frontline, Bomber Command conducted a series of massive raids against all known transport links across Northern France. It also *blitzed* any significant troop concentration areas and pulverised existing frontline positions, often attacking in broad daylight, (the *Luftwaffe* by this point had lost air supremacy over the battlefield). The Stirling continued to play its part in these missions even though Bomber Command was continuing its policy of withdrawing it from action as quickly as was possible.

During June 1944, shortly after the D-Day landings, No 90 Sqn gave up its Stirlings, followed two months later by No 218 Squadron. This left just one unit flying the Stirling on bombing missions, No 149 (East India) Squadron based at Methwold in Norfolk. The end though was not far off and on 8 September 1944, the squadron conducted its final bombing sortie with the Stirling when it participated in an attack on the German garrison holding out in Le Havre.

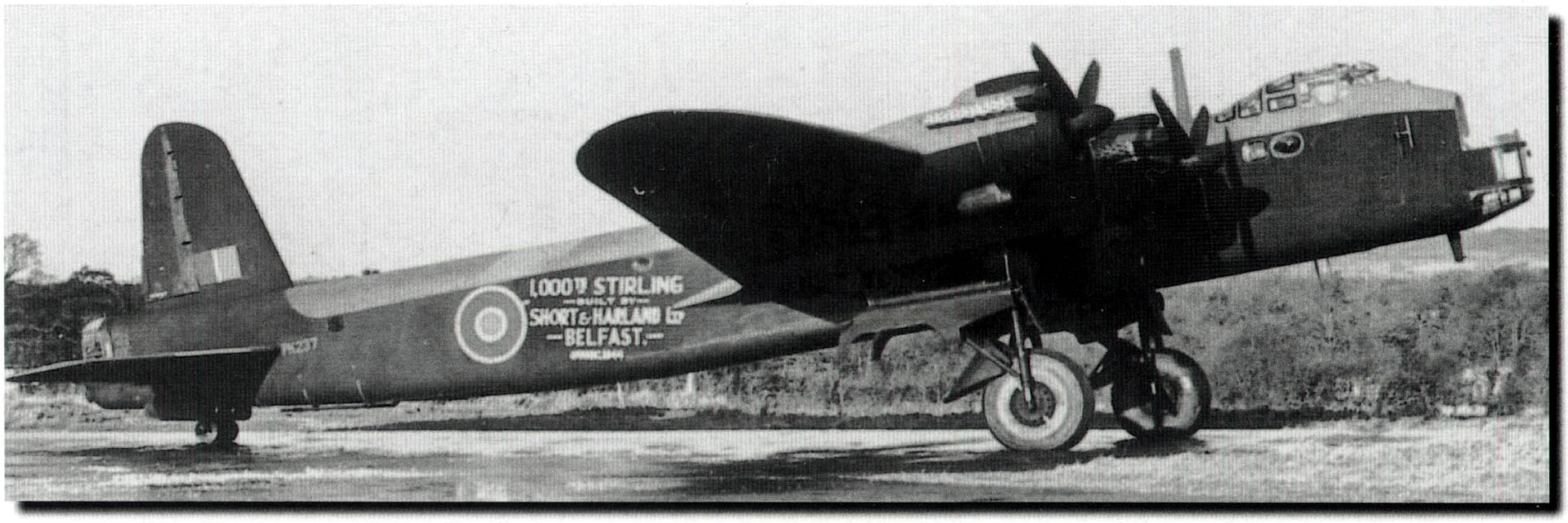
So ended the Stirling's career with Bomber Command. In total, between 1941 and 1944, it had undertaken 18,440 sorties and had dropped 27,821 tons of bombs against enemy targets. These figures though had not been achieved without cost. Out of 1,759 Stirling Mk I/II/IIIs built, 606 were lost on combat operations whilst a further 163 were written off in accidents.

Special Operations

As briefly mentioned earlier, from 1943 onwards the Stirlings of Nos 149 and 199 Squadrons began flying aerial re-supply missions to the Resistance movements across Europe who were waging a guerrilla-style war against the occupying German forces. The Stirling's range and good cargo carrying capabilities made it an ideal choice for such duties.

However, in May 1944, No 199 Sqn was formally transferred to Bomber Command's No 100 (Countermeasures) Group as a Support Unit tasked with using its Stirlings in the Radio Countermeasures role. This was an increasingly vital component of the RAF's bombing campaign against Germany which was becoming ever more technologically dominated as time went

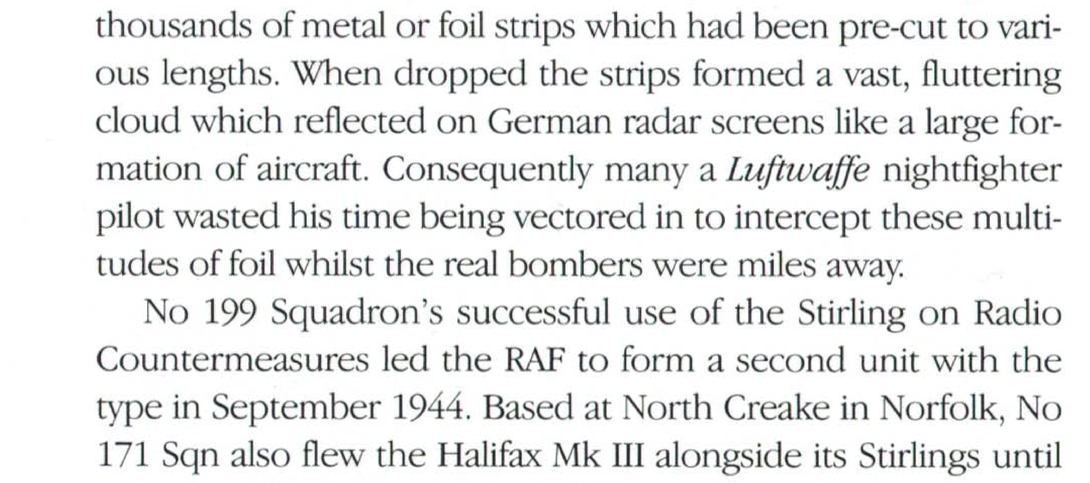
TOP Austin Motors-built Stirling Mk III, W7455 OJ•B of No 149 Squadron at RAF Mildenhall, probably in late 1941. It was whilst serving with this squadron that Flight Sergeant R H Middleton won his posthumous VC for bravery during a mission to Turin in November 1942



by. Jamming or confusing enemy radar became especially important. In a never ending game of cat-and-mouse, the RAF would develop new ways of negating German nightfighter or ground-based radar systems only for Nazi scientists to come up with more effective devices to which the RAF's 'boffins' would then have to devise alternative methods of overcoming. If German radar devices could be made ineffective then Bomber Command's casualty numbers would decline dramatically, so the need to stay one step ahead of whatever the enemy came up with was seen as crucial.

For its part in this 'electronic' warfare, No 199 Squadron's aircraft were modified to carry the 'Mandrel' radio jamming system which the RAF had discovered was particularly useful for spoofing the *Luftwaffe's* 'Freya' radar. Sporting an array of aerials beneath their fuselages, the squadron's Stirling Mk IIIs also carried highly effective 'Window' foil strip launchers. The precursor to most modern day chaff radar decoys, 'Window' comprised thousands of metal or foil strips which had been pre-cut to various lengths. When dropped the strips formed a vast, fluttering cloud which reflected on German radar screens like a large formation of aircraft. Consequently many a *Luftwaffe* nightfighter pilot wasted his time being vectored in to intercept these multitudes of foil whilst the real bombers were miles away.

No 199 Squadron's successful use of the Stirling on Radio Countermeasures led the RAF to form a second unit with the type in September 1944. Based at North Creake in Norfolk, No 171 Sqn also flew the Halifax Mk III alongside its Stirlings until January 1945 when it disbanded. Two months later, with the war in Europe virtually over, No 199 Squadron was also disbanded after successfully completing 1,378 sorties whilst with No 100 Group, (for the loss of just four Stirlings).



Glider Tug and Transport

The basic design of the Stirling made it ideal for use as a glider tug or transport as its days as a bomber drew to a close. With the Allies preparing to launch a massive airborne assault on Normandy to coincide with the seaborne invasion on D-Day, the RAF had an urgent requirement for additional transports or aircraft that could be used to tow gliders containing squads of paratroopers. Fortunately with the Halifax and Lancaster meeting the needs of Bomber Command a large number of Stirling Mk IIIs became surplus at just the right time. These were taken in hand for conversion as Stirling Mk IVs.

Two prototype Stirling Mk IVs were converted during 1943, EF506 and LJ512. Of the two, EF506 served as the basis for the glider tug model whilst LJ512 was adapted to act as a troop transport. To become a tug, EF506 was fitted with a new glazed nose section in place of its original forward gun turret and also had its dorsal turret removed. The existing tail gun was retained, (although some later Stirling IV glider tugs had this feature deleted too), and an ML glider towing apparatus was added to a yoke around the rear fuselage. In its new guise EF506 was able to tow either one General Aircraft GAL-49 Hamilcar heavy glider or two of the more numerous Airspeed Horsas. For training purposes up to five lightweight General Aircraft GAL-48 Hotspur gliders could be hauled aloft.

The first Stirling Mk IV glider tugs began entering RAF service during October 1943 and went on to operate with Nos 190, 196, 299 and 620 Squadrons. These units also flew the Stirling Mk IV transport variant as did Nos 295 and 570 Squadrons from mid-1944.

In its transport configuration as pioneered by LJ512, the Stirling Mk IV had its nose and dorsal gun turrets removed but retained its tail turret for defensive purposes. A glazed fairing was fitted over the nose and a large opening was cut into the rear fuselage floor to allow paratroops to jump out. The original bomb cells were converted to accommodate parachute-fitted supply canisters. Retaining the original six-man crew, the Stirling Mk IV transport could carry up to twenty-four paratroopers or thirty-four fully equipped airborne infantrymen.

Both variants of the Stirling Mk IV made their combat debuts over Normandy on 6 June 1944 when they were used to airlift the men of the British 6th Airborne Division. The Stirling Mk IV also went on to play an important role in 'Operation Market

TOP Stirling Mk IV, PK237, was the one-thousandth example to be built by Short & Harland in Belfast. To mark this event the aircraft received a special inscription as seen here when rolled out in December 1944

ABOVE A Stirling Mk V, PJ943, on a test flight prior to being handed over to the RAF during the spring of 1945. Notice the lengthened nose section with its upward opening hinged access and glazed nose cap. The Stirling Mk V could carry up to twenty paratroopers or forty fully equipped infantrymen when being used as a personnel carrier. Note the Extra Dark Sea Grey/Dark Slate Grey upper surfaces and Azure Blue under surfaces Service Transport camouflage scheme. (Credit: Shorts PLC)

Garden' during September 1944, when the Allies launched an ambitious airborne assault to seize a number of strategic bridges at Eindhoven, Nijmegen and Arnhem in the Netherlands. During ten days of operations, the six Stirling Mk IV squadrons assigned to Transport Command's No 38 Group, lost forty-four aircraft to enemy action and 105 crewmen killed.

Stirling Mk IVs were also used to support Allied ground forces as they moved across France and the Low Countries during the winter of 1944. The Stirling proved particularly popular for delivering supplies and morale boosting letters from home via the Air Despatch Letter Service (ADLS). The aircraft also undertook a vital role in delivering fuel to the units of the Allied 2nd Tactical Air Force which was operating from forward bases across Europe. This crucial fuel was delivered in special 5 gallon drums accommodated inside the Stirling's fuselage.

Having already used the Stirling bomber on covert supply missions to the Resistance, the RAF was keen to employ the dedicated transport variant in a similar role on behalf of the Special Operations Executive (SOE). It was the SOE who liaised, monitored and tried to co-ordinate all the various Resistance movements operating throughout Europe as well as arranged all the necessary supply drops and sent out agents to conduct sabotage missions or spying.

To help undertake this secretive work, the RAF created No 138 (Special Duties) Squadron at Tempsford in June 1944, with Stirling Mk IVs. It was joined a few months later by No 161 (SD) Sqn while a third unit, No 624 (SD) Sqn undertook similar duties out of Blida airfield in Allied-occupied Italy from where it covered SOE's operations in the Balkans, Greece and Southern Europe. No 624 only lasted three months before a new Italian based unit, No 148 (SD) Squadron took over until it too was disbanded in December 1944 as SOE wound down its Mediterranean theatre operations.

As the war in Northern Europe moved into its final stages the RAF's Stirling Mk IVs took part in their final major airborne operation when they helped ferry British paratroops across the River Rhine during March 1945. This was the last natural obstacle confronting the Western Allies and its successful crossing combined with a major offensive in the East by the Russians helped lead to a rapid collapse of most German resistance. With the need for covert, behind enemy lines missions diminishing by the day as the Allies moved swiftly through Germany, No 138 (SD) Squadron disbanded in March 1945. It was followed three months later by No 161 (SD) Squadron. Of the glider tug/transport Stirling Mk IV equipped units, all had gone by March 1946.

Dedicated Transport

The success of the Stirling Mk IV conversion inspired Short Brothers to build a dedicated, long-range freight transporter variant. Designated as the Stirling V, 160 examples were eventually produced by the Short & Harland factory in Belfast.

During August 1944 the prototype Stirling Mk V, LJ530, which featured a lengthened nose complete with an upward opening hinged section and glazed cap, undertook its maiden flight. The hinged nose section allowed easy access to the aircraft's forward cargo bay which was fitted with a beam, block-and-tackle device, for loading/unloading freight. Access to the rear cargo hold was provided via a starboard fuselage side door-



Stirling VCs

On the night of 28/29 November 1942, Flight Sergeant R H Middleton, an Australian serving with No 149 Squadron, was en route to attack Turin in Stirling Mk I, BF372. Middleton's aircraft was heavily laden with fuel and bombs for the flight and as it struggled to get across the Alps at a height of 12,000ft poor weather impeded its progress. By the time BF372 crossed into Italy, Middleton knew he didn't have enough fuel remaining to get back to Britain. Despite this fact, he pressed on to Turin where to his dismay he discovered that the target was partially obscured by cloud and smoke screens. With his Bomb Aimer unable to identify the target precisely Middleton was forced to descend to just 2,000ft. Enemy searchlights soon began tracking the Stirling as he flew three times over Turin until his Bomb Aimer managed to find their objective.

Flak had already damaged BF372 but as Middleton followed his Bomb Aimer's instructions and headed for the bomb release point, a heavy calibre anti-aircraft shell wrecked the Stirling's wing. The cockpit area was showered in shrapnel leaving both Middleton and his Co-Pilot, Flight Sergeant L A Hyder, badly wounded. Indeed Middleton was so severely injured that he immediately passed out and BF372 plunged towards the ground. At just 800ft, Hyder somehow managed to regain control and guide the Stirling back up to 1,500ft whereupon the Bomb Aimer released the bomb load over the target area.

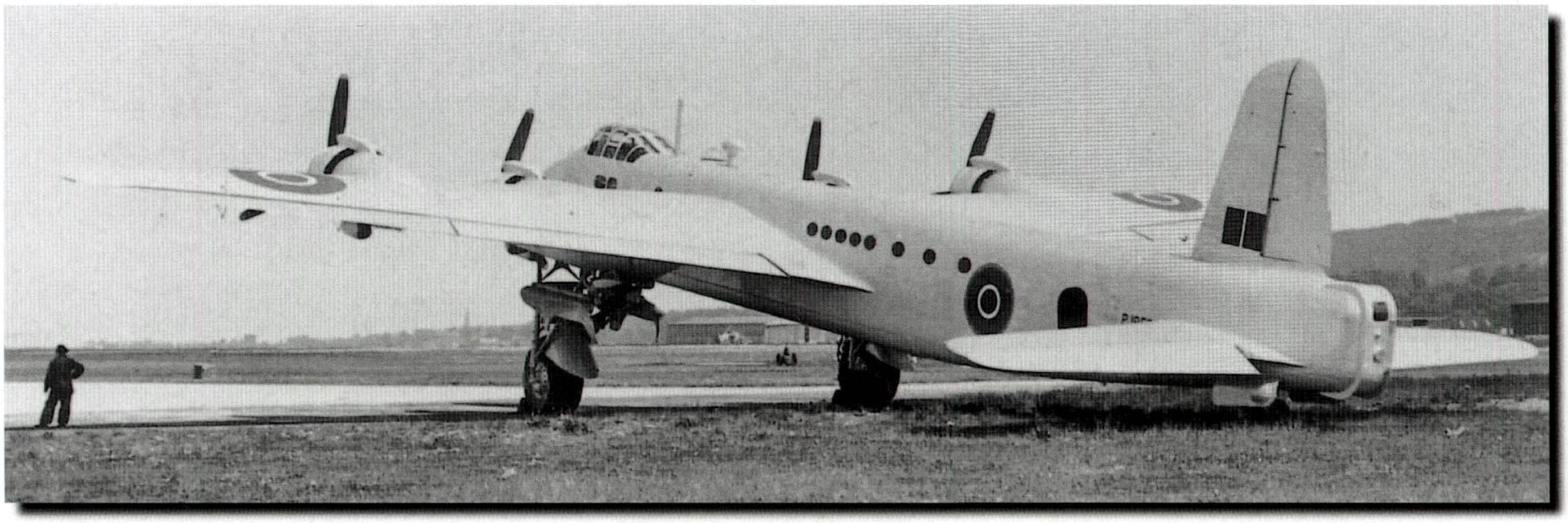
Middleton regained consciousness shortly afterwards and despite his own wounds ordered Hyder to get some First Aid in the aircraft's Rest Area whilst he struggled to fly the crippled Stirling back in the direction of Britain. Everybody onboard realised they wouldn't make it but amazingly BF372 managed to keep airborne and limped back over France although it was again hit by flak. With just 5 minutes worth of fuel remaining, Middleton's aircraft reached the Channel and as it crossed the French coastline he ordered his crew to bail out. With the Stirling's engines beginning to cough and splutter as their fuel dried up Middleton, despite being in agony, remained at the controls and kept the damaged bomber level while his colleagues jumped clear. Unable to get out in time Middleton went down with his aeroplane as it plunged into the sea. For his selfless bravery, Flight Sergeant Middleton was posthumously awarded the Victoria Cross in January 1943.

A second VC

On the night of 12/13 August 1943, Flight Sergeant A L Aaron from No 218 Squadron was also part of an attack against Turin in Italy. Flying Stirling Mk III, EF452, he approached his target and fell in behind another Stirling which was heading along the same course. Unfortunately, the tail gunner of the lead Stirling mistook them for an enemy nightfighter and opened fire at close range. Bullets ripped into Aaron's Stirling causing an enormous amount of damage. The Navigator was killed immediately whilst several other crew members sustained injuries. Aaron himself suffered severe facial lacerations, a smashed jawbone, (which rendered him unable to communicate verbally), a broken arm and most critically, a punctured lung.

As Aaron collapsed at the controls, EF452 went into a steep dive and didn't level out again until it reached 4,000ft when one of the surviving crew members somehow managed to reach the cockpit. With the untrained crewman keeping the Stirling level, Aaron, who had recovered his senses sufficiently, passed him written instructions to follow. Ditching its bombs, the Stirling steered a course for Bone airfield in North Africa which was under Allied occupation.

After receiving some limited First Aid, Aaron retook control of EF452. Upon reaching Bone he discovered that the runway was blocked by the wreckage of a burnt-out Wellington. Aaron had no choice but to try and belly land his damaged aircraft alongside. Twice he attempted to get the Stirling down but each time had to abort at the last second to avoid crashing. With EF452's fuel tanks virtually dry and Aaron barely conscious, another crewman took over and despite his lack of training as a pilot managed to safely land the Stirling. Aaron was taken to a nearby hospital but died a few hours later. For his courage and determination, Flight Sergeant Aaron received a posthumous Victoria Cross in November 1943.



way. Due to the fact that it was an integral part of the original design the bomb bay was retained because removing it would have meant major redesign work of the entire airframe and this was considered simply unnecessary.

To cater for heavy freight loads the Stirling Mk V was provided with a reinforced cabin floor which enabled it to carry either twenty paratroops or forty fully equipped infantrymen. Alternatively it could be used as a medical evacuation aircraft in which case it could accommodate a dozen stretchers and fourteen seated casualties. As a vehicle transport the Stirling Mk V could take two jeeps or a jeep with one field gun, its tender and a full load of artillery shells.

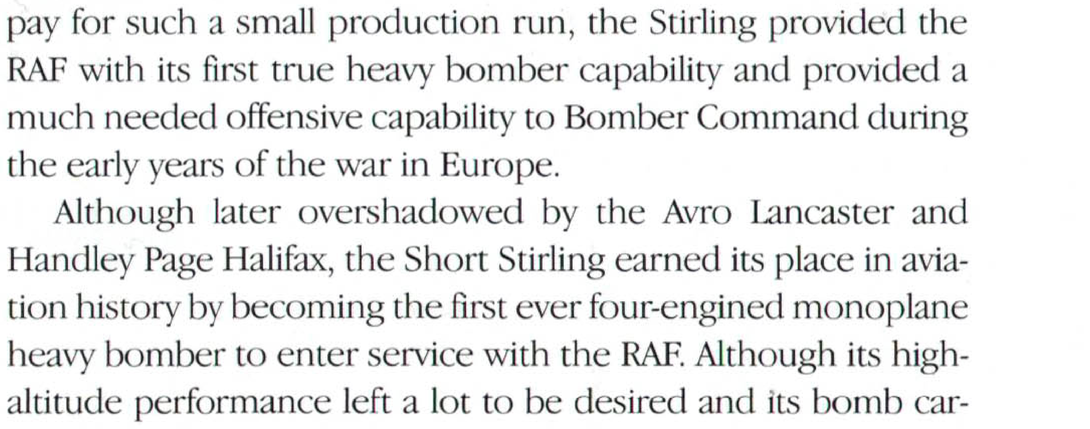
Production standard Stirling Mk Vs began entering service with the RAF in January 1945, with the initial deliveries going to No 46 Squadron at Stoney Cross. The next month No 242 Squadron began converting and eventually the Stirling Mk V went on to serve with Nos 51, 158, 196 and 299 Squadrons, (these last two being existing Stirling Mk IV users). Two other units, Nos 1588 and 1589 Heavy Freight Flights (HFFs) were also formed to fly Stirling Mk Vs on dedicated long-range cargo flights.

From February 1945, No 46 Sqn began operations with its Stirlings from Britain to Algiers in North Africa. These missions were later extended to reach Tripoli in Libya whilst from April 1945 the RAF began using Stirling Mk Vs on services to India using pre-war Imperial Airways or BOAC routes. By May 1945 these Indian flights had become the Stirling Mk V's bread-and-butter work. With the war against Germany at an end the RAF began making plans to move a number of its bomber units to the Far East where they would be known as 'Tiger Force'. Once established 'Tiger Force' was to conduct strategic bombing missions against the Japanese in Burma, South East Asia and China. To support these missions the Stirling Mk V was to act as the primary supply aircraft bringing in fuel, ammunition, food, clothing and spare parts as required.

The RAF was also tasked with flying ground troops to India to reinforce the British armies fighting in Burma. On average each Stirling Mk V flight covered 6,500 miles and involved a total flying time of nearly thirty-two hours spread over five days with overnight stops in Libya, Palestine, Iraq and Northwest India. However these missions ended abruptly, (as did the 'Tiger Force' preparations), with Japan's unconditional surrender in August 1945 and the Stirling Mk V's service career faded rapidly as the superior Avro York came on stream. By 1946 only one unit, No 46 Squadron, was left flying Stirling Mk Vs, but it too withdrew them in May of that year when it switched over to the Douglas Dakota. A few Stirling Mk Vs remained operational with No 1588 HFF at Santa Cruz in Bombay, India. These soldiered on, undertaking long-range cargo sorties between Britain and India until July 1946 when the curtain finally fell on the Stirling's career with the RAF.

In all 2,371 Stirlings had been built for the RAF which was a relatively small number when compared to the 7,374 Lancasters, 6,178 Halifaxes and 11,461 Wellingtons produced. When compared to American heavy bomber output, (13,000 B-17s and a massive 19,000 B-24s), the Stirling's production figure was tiny. Out of the total number built, 641 aircraft were lost through enemy action or by accidents which represents just over 25% of all Stirlings made. Although this was a high price to pay for such a small production run, the Stirling provided the RAF with its first true heavy bomber capability and provided a much needed offensive capability to Bomber Command during the early years of the war in Europe.

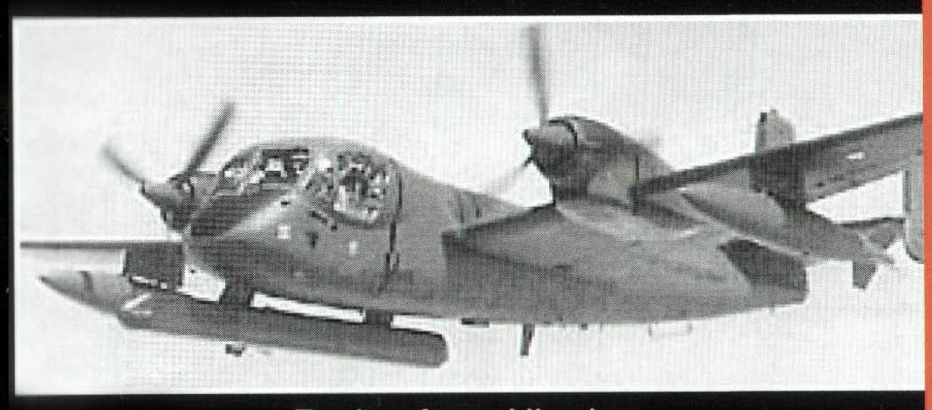
Although later overshadowed by the Avro Lancaster and Handley Page Halifax, the Short Stirling earned its place in aviation history by becoming the first ever four-engined monoplane heavy bomber to enter service with the RAF. Although its high-altitude performance left a lot to be desired and its bomb carrying capabilities became outdated, the Stirling's long-range and robust construction won it the affection of its crews. During the early years of the Second World War it played a leading role within Bomber Command and once it had been replaced by more capable aircraft, the Stirling went on to forge out a new role for itself as a successful glider tug and transport. However for most people it will always be remembered as the first of the RAF's 'heavies'. AM



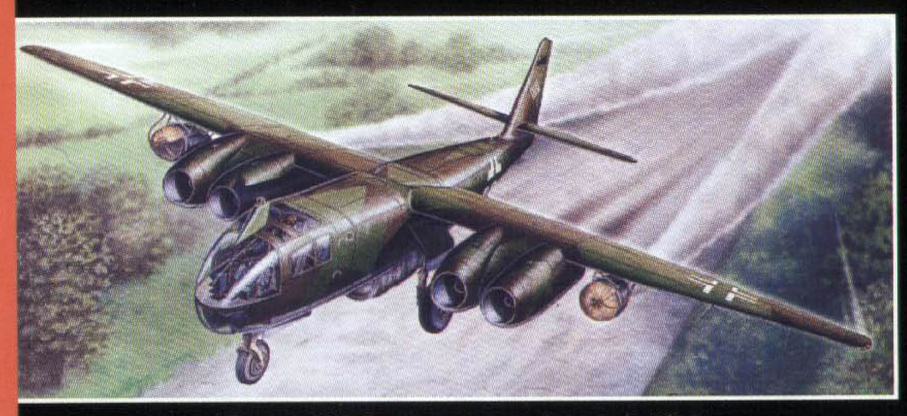
TOP An immediate post-war view of PJ950, a purpose-built transport, Stirling Mk V variant. 160 Stirling Mk Vs were built by the Short & Harland factory in Belfast. The first examples joined the RAF during January 1945 but their service careers were relatively brief and all had been retired by July 1946. Note the overall painted Aluminium finish and turretless rear fuselage fairing

ABOVE Stirling Mk V, PJ958 photographed sometime during mid 1945. Aircraft such as this one performed valuable long-range flights from Britain to the Far East in the aftermath of the war. This particular machine was fitted with civil airliner style seating. Note the propeller spinners and the overall painted Aluminium finish

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Williams Bros from USA
1/53 Scale Aircraft
WB53198 Lockheed 10 Electra
.....~~$27.95~~.....**$24.97**

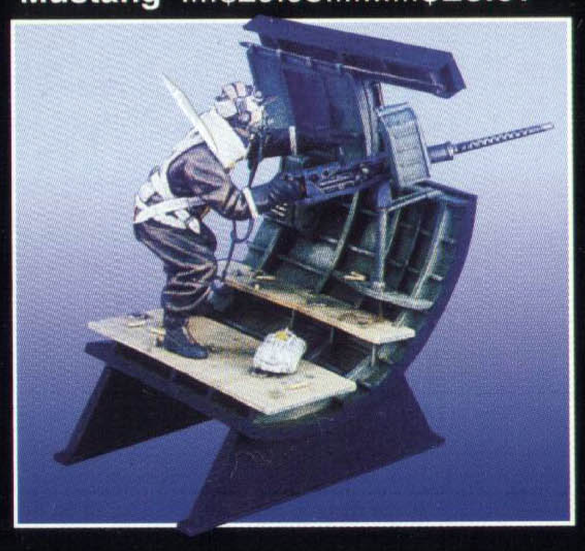


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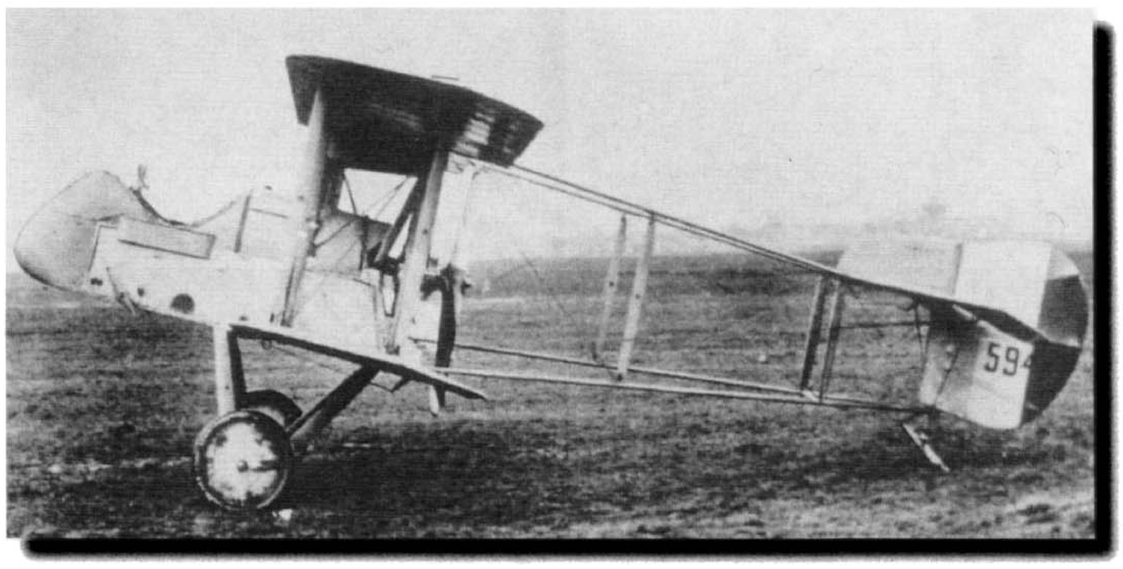
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Royal Flying Corps

Colours and markings



In this two-part look at the surface finishes applied to British Military Aircraft of the 1914/18 War, Paul Lloyd offers the results and conclusions of years of research in to this fascinating subject. Part One: The colour of RFC Green

IT SEEMED A SIMPLE ENOUGH TASK TO TRACK DOWN old references for the colours of aircraft finishes used during World War One. I should have suspected that it would not be all that easy otherwise someone else would surely have done it already, and sadly much of the corroborative evidence I had hoped to uncover does not seem to be there to be found!

However, a lack of obvious information is no reason not to make an attempt to sort out what little we do have and perhaps this short work will draw out some previously undiscovered bits of information from the readership that will help to make the picture a little clearer for us all? Certainly what 'official' records there are have proved rather unrevealing to say the least, and books on the subject, such as 'The History of Paint' by G P A Turner, despite being very informative on the subject of *paint*, shed very little light on the manufacture and use of coloured protective finishes for military aircraft.

After all my endeavours I have come to suspect that many of the previous attempts to duplicate British Aircraft Camouflage of this period have been thwarted by apparently ambiguous or even misleading information originating from a variety of sources. This has become further aggravated by misinterpretation of the limited information regarding the pigments and quantities of materials used.

ABOVE An unarmed Airco D.H.2 in pre-camouflage scheme with clear doped fabric nacelle sides but presumably grey-doped metal and plywood work. Note that the serial number, 5943, is in black on the rudder but does not have the white border that became the accepted practice later on. This aircraft was from the first D.H.2 production batch and this factory photograph was taken at Hendon early in 1916 but is otherwise typical of the type prior to the application of PC10. The D.H.2 is one of the types that may have been seen in a greater variation in shade of PC10 than any other, presumably because so many were refinished at unit level.

OPPOSITE TOP The first British military aircraft to land in France after the start of World War One near Amiens at 08:20hrs on 13 August 1914. British Military Serial Number 347 was flown by Lt Harvey-Kelly of the Royal Flying Corps. Note that this early 'wing-warp', B.E.2 is clear-doped with its serial number on the rudder as the only identification. It has plain metal cowlings with what appear to be grey-doped plywood decking around the cockpit and clear varnished struts **BELOW** A frame from a short film of Max Immelmann in front of his 'latest victim', but it is also shows an excellent bit of detail on the B.E.2, illustrating the use of doped fabric bindings around the inboard struts. This binding became a common feature of nearly all PC10 finished aircraft and was intended to protect the wood from the effects of engine oil and especially wear and tear. It is less evident on earlier uncamouflaged aircraft

A Workable Frame of Reference

For the purposes of this feature I am using ordinary Humbrol Enamel colours as my main frame of reference. There are a number of reasons for this. First of all even if I did give the colour descriptions in question exact colour matches with BS, FS or Methuen standards, I doubt that the average modeller is going to have all these same references to hand so they will be of precious little use. The Humbrol range is much more accessible than these expensive book references, which in turn may translate into specialised paints that might only be available by mail order and at premium prices. Besides we can really only make a best guess as to the actual shades in question as batches of any paint are prone to a certain amount of variance and so Humbrol stand just as much chance of being correct as any other commercially available paint.

Many years ago Humbrol made valiant efforts to produce an 'authentic' range of colours for modellers. Since then we have seen the advent of the Humbrol Colour System which uses carefully defined quantities of various base colours combined by the modeller to produce an accurate duplication of the original shade. Many of these concoctions are rather too long-winded, messy and prone to error for the average modeller to be bothered with. Complexity is something I hope to avoid with my own simpler 'recipes', which I happen to believe stand as much chance of being just as accurate.

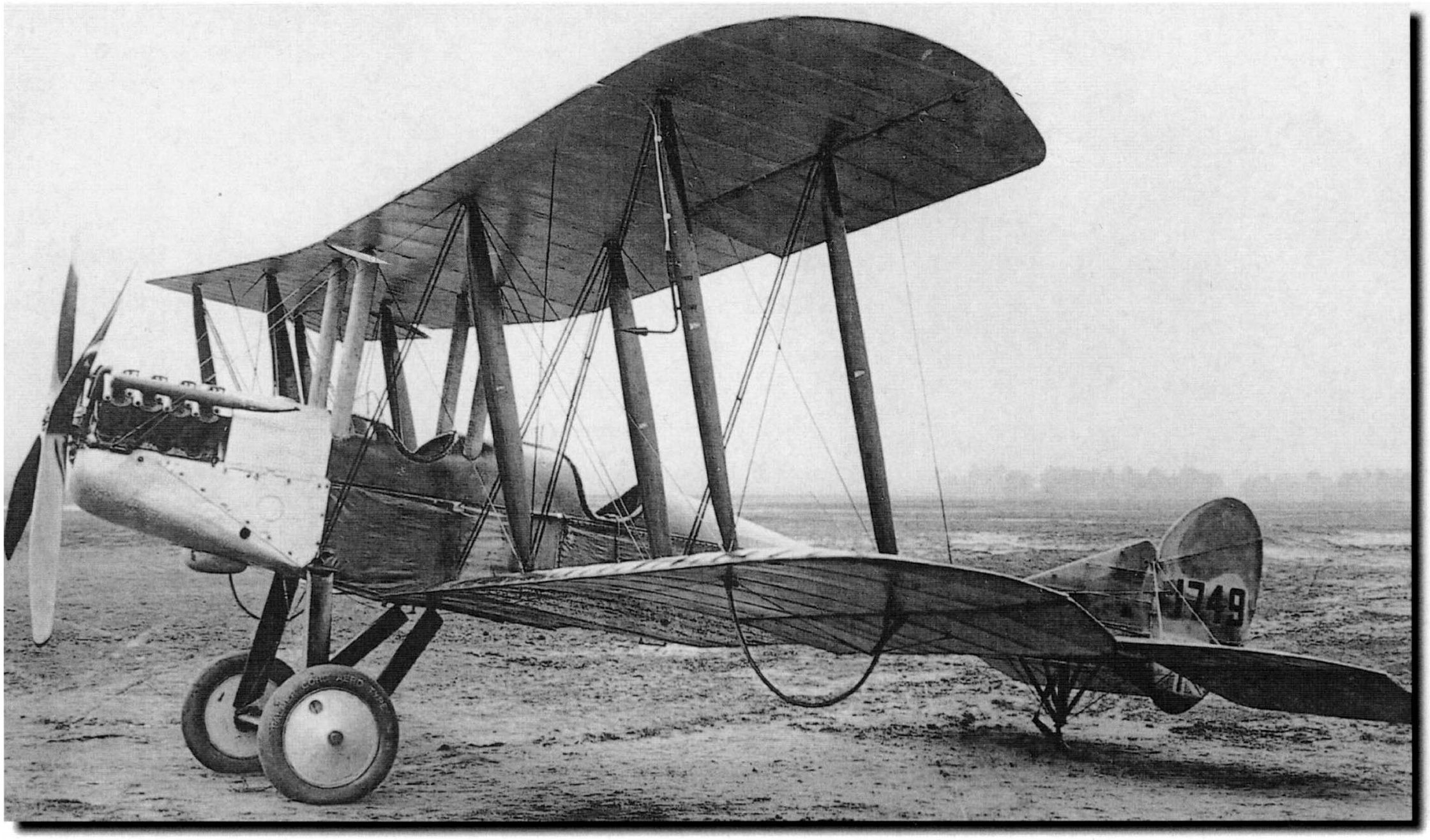
Sources of Reference

The record shows that back in 1914, the Royal Aircraft Factory, (which became the Royal Aircraft Establishment on the formation of the Royal Air Force), working with an Advisory Committee for Aeronautics, had begun experiments with various aircraft finishes. In the written report that followed it was suggested, *"That a natural oxide of iron darkened with a little lamp black and suspended in a clear cellulose dope would provide sufficient protection for aircraft operating on the Western Front"*. This would come to be known by the designation 'Protective Coating No 10, abbreviated to PC10 and referred to generally as 'Royal Flying Corps Green'.

Following a period of experimentation a stock of standard samples was produced and these were held by the Inspector of Armaments, for issue to prospective suppliers and manufacturers as a guide to the required colour value.

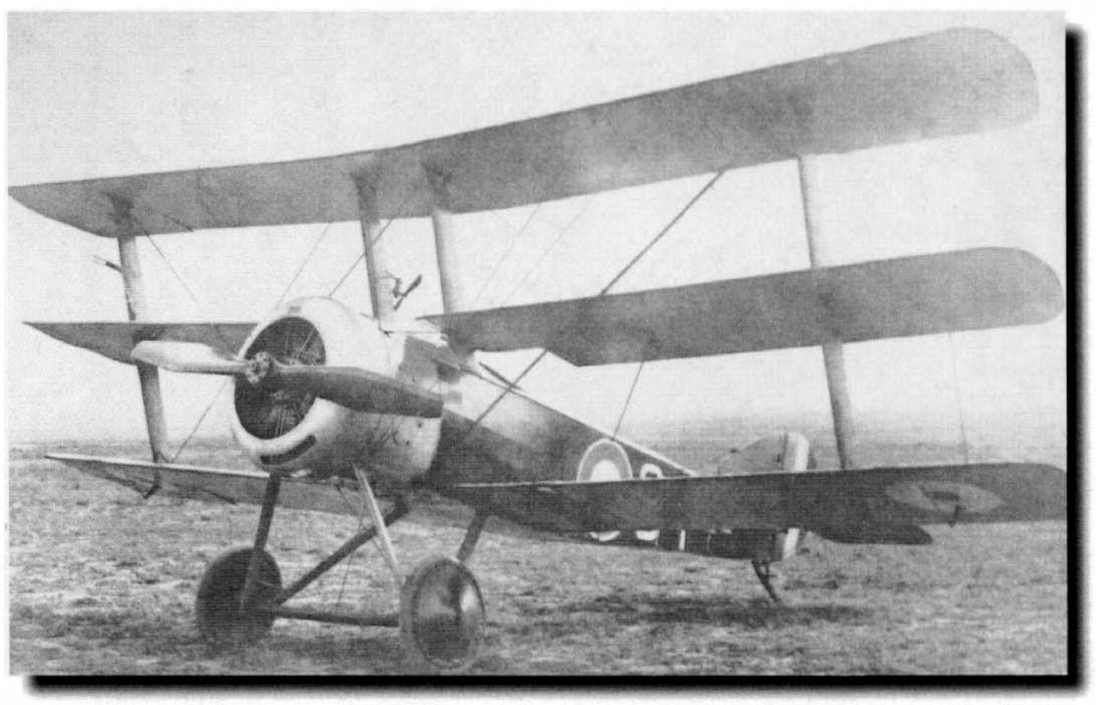
Unfortunately none of these samples or their written specifications are thought to have survived the passage of time and we therefore have no actual source of reference from which to





work. A certified sample may well have faded and discoloured with time but technology has moved on and subjecting it to mass spectrometry would reveal a great deal about its constituent materials. In the absence of such definitive evidence we are forced to make the most of what else is available which sadly isn't very much.

I am lucky enough to have spoken with veterans of the Great War and apart from their astonishment that anyone would want to know the colour of anything from the Great War, they all asserted that although the Army Khaki colour, as applicable to uniforms and personal equipment, was usually a variation on an indistinct green/brown colour, the 'paint' as applied to vehicles, tanks and in particular aircraft, was generally a distinctly *greener* and more consistent shade but which was still generally referred to as 'Khaki'. In the case of aircraft this was generally referred to as 'RFC Green'. Variations and exceptions to the 'rule' are said to have occurred, which seems to be backed up by the photographic record, and of course we have to accept that the passage of time will have had its usually detrimental effect on memory, (including mine), but eye witness testimony is still an important, (and sadly undervalued), form of evidence that cannot be dismissed out of hand.



Up until the mid 1960s just about every author on the subject consistently referred to all camouflaged WW1 British aircraft as being finished in a shade of Khaki Green and consequently neither illustrators nor printers would have considered anything other than green for their aircraft colour profiles.

Then a new theory began to circulate that favoured variations on *brown* which steadily grew in popularity, apparently because this was based on the new expert opinion derived from careful research and experimentation by qualified historians. Some authorities seem to have been carefully 'hedging their bets' and went along with the idea that whilst the RFC might

TOP A B.E.2c built for the War Office and used in the UK to test camouflage patterns. The small Union Flag at the base of the rudder and lack of wing markings places this picture in the period towards the early part of 1915. This experimental disruptive pattern was abandoned at an early stage in favour of an all-over solid PC10 colour finish. It is worth noting that the inboard struts have been linen bound and doped **ABOVE** A Sopwith Triplane with what appears to be a dark PC10 finish and a plain, 'dull' metal cowling. The fin shows signs of a slight variation in tone to the fuselage and this may well have been refinished at unit level as this often carried the Sopwith logo on a clear doped background on delivery. Because this aircraft is unarmed and given the dull appearance of the cowling, I am inclined to believe that this is a late war survivor, possibly used as a Squadron hack by a Home Defence unit? However it is a good indication of how photographs can be just as misleading as helpful if they are not studied with care!
OPPOSITE A Morane Saulnier N monoplane in British service, which had the wheel covers, cowlings and spinner painted Red to distinguish it from the Fokker E.III. Only some forty-nine of these excellent, but tricky to handle, aircraft were built with twenty-four being used by Nos 1, 3, 24 and 60 Squadrons RFC, where they were popularly known as Morane 'Bullets', and were famous for the unique bullet deflectors fitted to the propeller blades. On the original photograph it is possible to discern the actual brush strokes in the Red paint on the spinner and cowlings but it is impossible to tell from the photograph alone what colour this actually was so it seems unlikely that green and brown are any easier to interpret



have used variations on a Khaki Green PC10, the RNAS re-finished their aircraft with a much browner version possibly based on PC12. Then again others have suggested that a wide variety of shades were in use due to poor quality control within the paint industry. I have seen little or nothing in the way of conclusive evidence to support any of these hypothesese.

Studying photographs resulted in a rather ambiguous stalemate to say the least and it seemed quite possible that a large proportion of the apparent anomalies in tonal quality could simply be the side effect of various light conditions rather than any dramatic differences in colour, which is virtually impossible to define from black and white photographs anyway.

It had also become blatantly obvious that studying preserved samples of doped fabric was likely to lead to a lot of confusion as these would have deteriorated over time but more importantly, there were no absolute guarantees as to the condition, age or authenticity of such samples when they were actually acquired for preservation.

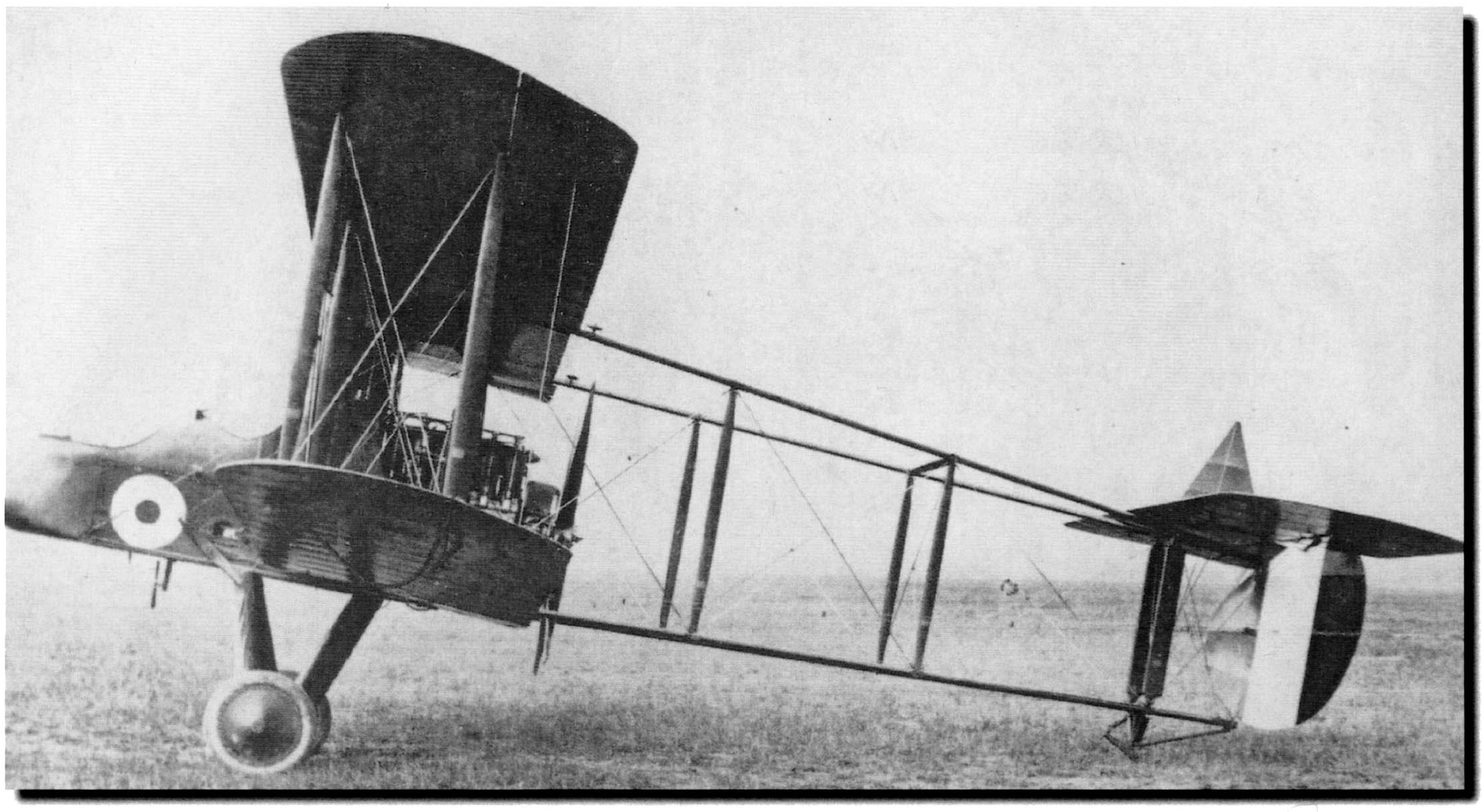
I would be the first to admit that this is a rather difficult area of research, further complicated by the fact that colour is so prone to individual interpretation. However, much of the earliest 'hands-on' research work seemed to have been far more accurate than a great deal of the subsequent analysis would have us believe and it tended to suggest that the nearer to the events in question that the research was carried out, the more chance it had of being accurate.

For my part I was particularly concerned about this idea that PC10 'Royal Flying Corps Green' might actually have been *brown*, and I really wanted to try and find out what might have been going on during the early period of its introduction with evidence of various shades of camouflage occurring in the black



TOP A splendid line up of D.H.4s finished in a rather uniform, dark PC10, showing that although plain metal cowlings were not specific to any one type and varied with the subcontractors whim. It also suggests that batches of aircraft from different sub-contractors were finished with very similar shades of PC10. These aeroplanes are all aircraft of No 27 Sqn., RFC, indicated by the white vertical bar on the fuselage sides and the Flight letter codes - A to F - marked on the cowlings. As with other photographs of the period the censor has carefully removed the serial numbers that would have been on the rudders as the top of one such can be just made out on aircraft 'B' **ABOVE** A Sopwith Triplane of unknown origin possibly destined for the RNAS as it has a particularly glossy finish. Note that the Sopwith logo, (that was invariably positioned on the fin of Sopwith built aircraft), has been overpainted. It is finished with 'dark' cowlings even though RNAS aircraft were often supplied with 'jewelled' cowlings. These are most probably PC10 although No 10 Sqn RNAS had black cowlings and wheel covers. Note also that the cockade and rudder stripe blue is relatively light

OPPOSITE TOP An F.E.2 in what appears to be a 'night' finish of what might well be PC10 rather than the sooty black - but unfortunately it is difficult to say for certain. Note that the underwing cockades and presumably those on the upper wing surfaces have been painted-out, with a smaller version added to the nacelle. Although the rudder does not appear carry a serial number this was most probably removed from the photograph by the censor prior to its publication during wartime **BELOW** A Sopwith Camel, of uncertain origin, with bare metal engine cowling, varnished wood panelling and PC10 upper surfaces. This aircraft is fitted with bomb racks which was a common feature of many late-war fighters which were used in the ground support role. The two white bars just ahead of the tailplane might indicate that this was a No 46 Sqn aircraft who used this identification marking on Sopwith Camels from September 1917 to March 1918



and white photographic record.

I have noticed over the years that even on relatively modern aircraft, greens in particular are prone to surface discolouration when exposed to the elements for prolonged periods, with the result that they can eventually turn dark brown, reddish brown or even dark pink as the ultra-violet radiation breaks down the chemical constituents. This has often been misinterpreted as, 'paint wearing away to reveal the underlying primer coats', which is evidently not the case at all. A quick polish with a proprietary paint-restoring compound will soon prove this beyond any doubt.

Unfortunately military aircraft of WW1 didn't usually survive long enough for deterioration of the surface finish to be a significant factor in producing different shades of surface coating. I came to realise that it was all very well for me to theorise about what might have been going on but this would prove nothing unless it could be backed up with some sound practical experience based on careful experimentation. Unfortunately I had no idea what to base this experimentation on?

A Course of Action

I decided that the best thing to do would be to try and avoid second-hand descriptions of what colour PC10 might have been as much as possible and make up my own fresh samples from the raw materials to whatever 'recipes' I could find and see what they looked like. Aircraft finishes, of this type, are designed to protect the relatively fragile fabric from the harmful effects of the sun and weather, with camouflage a secondary, but still important, consideration, yet it must not be forgotten that the resultant colour was supposed to conform to a predetermined standard.

After dredging through a small mountain of old magazine and book references, I was able to find only two authors prepared to commit any sort of PC10 formulae to paper and sadly the source of their information is vague at best.

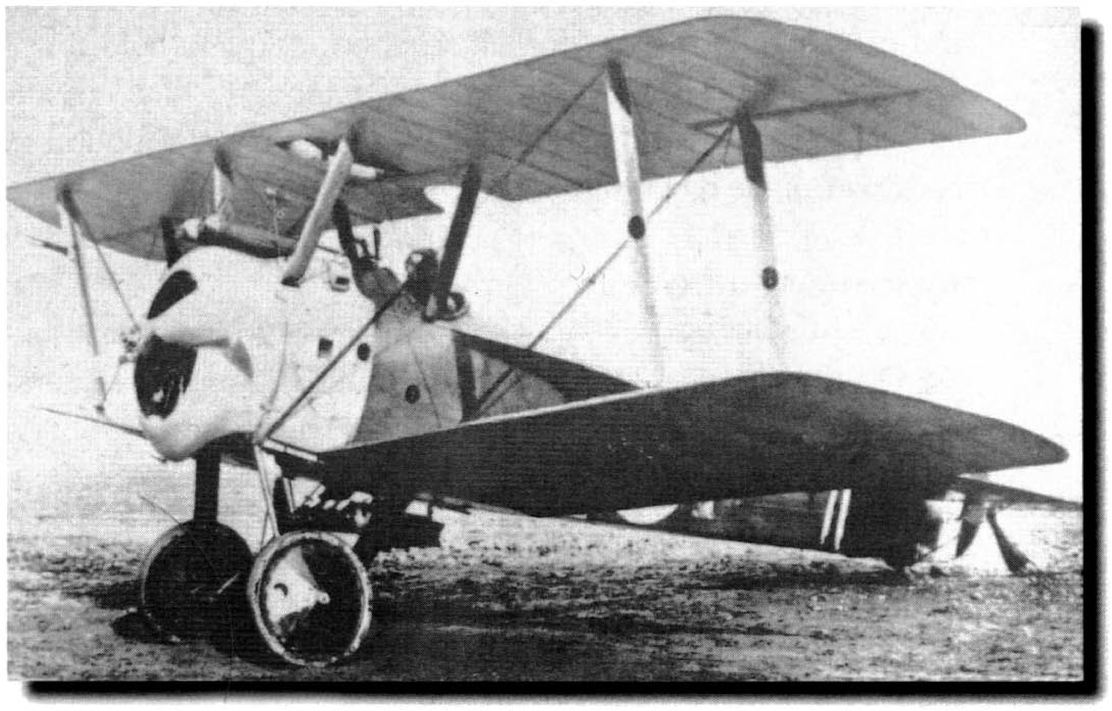
Writing in the Harleyford publication 'Camouflage and Markings 1907 to 1959', Bruce Robertson makes reference to PC10 being composed of Yellow Ochre and Lamp Black, but unfortunately without giving any quantities of either ingredient. Then during the 1960s in 'Airfix Magazine', he suggested that a 100 gallon batch of PC10 was made using 40lbs of Yellow Ochre, 30lbs of Umber, 40ozs of Red Ochre, with 25ozs of Chinese Blue for darkening, and a trace of Lamp Black for use if further darkening was required. This was apparently based on the records of the Cellon Paint Company who were one of the major manufacturers responsible for supplying the aviation industry with surface finishes.

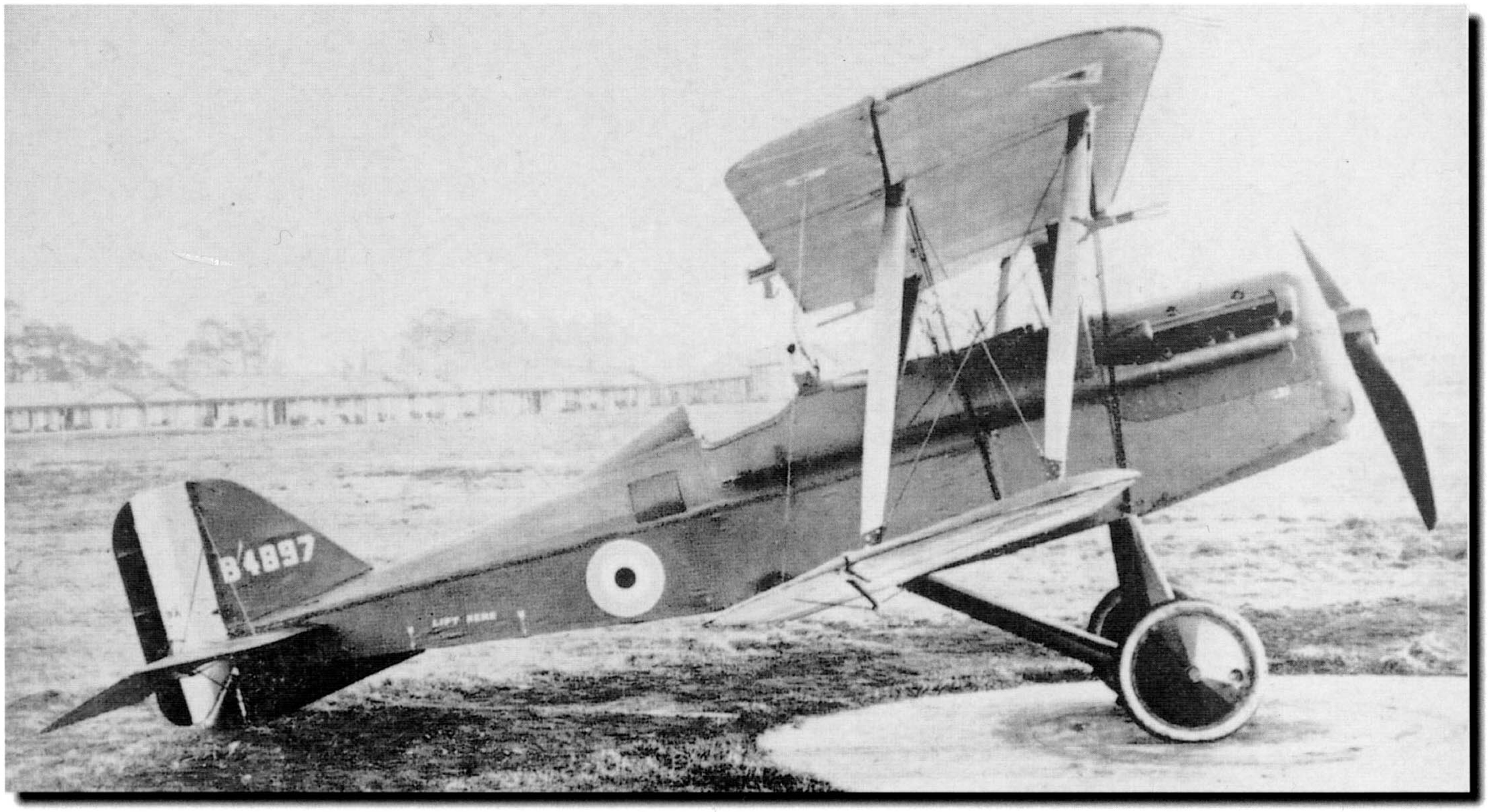
I have also read assertions by Ian D Huntley, AMRAeS, in a variety of journals over the years but most notably in Kenneth Munson's 'The Pocket Encyclopaedia of World Aircraft in Colour', that the ingredients used to make PC10 were Yellow Ochre and Lamp Black mixed with a Cellulose/Acetone 'varnish'.

This certainly fits in better with both one of Bruce Robertson's suggestions and what I have read of the Royal Aircraft Factory's experiments. It may even be the official specification for producing PC10.

Clear Dope

However, prior to the introduction of PC 10, British Military aircraft were uncamouflaged, being the natural colour of the best quality Irish Linen, treated with several coats of clear cellulose dope to seal its otherwise porous texture. This resulted in





a pale cream colour that appeared slightly darker where the material overlapped. It is sometimes suggested that the dope would also have imparted a slightly Amber tint to the fabric, but even though the dope may have darkened with age it had no actual colour value when freshly applied and aircraft of this period seldom lasted long enough for any age darkening to become particularly apparent, unlike dusty old museum exhibits for example. The result was semi-opaque and it was possible to see a lot of structural detail through the wing when the light was behind.

I happen to think that the best way to represent this in model form would be with clear plastic mouldings, representing the internal structure with narrow strips of opaque decal film, tape or dark paint and then applying a coat of a light cream paint mixed with clear varnish, thereby effectively simulating the see-though effect. Unfortunately the various kit manufacturers I have consulted on this matter seem rather reluctant to try anything quite so adventurous and we are forced to make do with an opaque finish.

(Ed Note: I believe that one of Roden's 1/48 scale Sopwith 11/2 Strutters was moulded in clear plastic?).

To make matters worse this is often a dull Grey plastic that will have to be primed White before any colour can be applied and the best representation of Irish Linen I can come up with is Humbrol 71 Satin Oak or even 41 Gloss Ivory. I have found that Humbrol 74 Linen is far too Yellow, although you could use it for a little subtle high lighting of overlapping fabric if you really want to, but it doesn't represent an accurate representation of any Irish Linen I have ever seen.

Metal and Woodwork

Engine cowlings and metal panelling on both early clear and some later PC10 doped airframes were often left in a dull natural metal, scoured with steel wool and having Lanolin applied sparingly to inhibit corrosion, but as this was simply wool fat, with only a slightly yellowish tint, it imparted no particular colour to the actual metal. Cowlings and metal fittings were usually made from sheet Aluminium alloy or a product known as Alclad, a sandwich of Aluminium and Duralumin alloy developed especially for the aviation industry and in widespread use from 1910. There appears to be no evidence to suggest that operational aircraft of WW1 vintage ever had their metal parts highly polished.

Here we have something of a modelling dilemma as paint is never ideal for reproducing even 'scoured' bare metal but variations on 11 Metallic Silver and 56 Metallic Matt Aluminium should just about cover it. Some cowlings also appear to have been painted gloss black or dull grey depending upon the whim of the manufacturing sub contractor, something which carried over to the later camouflage era although Royal Aircraft Factory S.E.5as were virtually unique in having PC10 cowlings from the outset.

A particular exception on early types were the Morane 'Bullet' monoplanes operated by the RFC which had all their metalwork painted bright red to distinguish them from the German Fokker E.III. This excludes any identification markings used later in the war such as the distinctive red-nosed Sopwith Camels of No 209 Squadron.

External woodwork such as ply decking or spruce struts were usually treated with a clear 'varnish' or grey dope. Inboard struts were often bound with linen tape and finished in grey dope and this was also the case with many of the tail booms on pusher types which, again contrary to popular myth, were usually made from metal tube. The shade of grey is unclear but it been variously described as 'Battleship Grey' which may have been close to what is generally referred to as Admiralty Grey but personally I would just use Humbrol Primer or 64 Matt Light Grey.

Woodwork is always a problem to represent but I suggest mixing equal portions of Humbrol 9 Gloss Tan, 49 Matt Varnish and cellulose thinners *brushed thinly and in one direction only* along the length of a panel or strut over a 71 Satin Oak

ABOVE Royal Aircraft Factory built S.E.5a in factory fresh finish in the typical RFC 'dull' Green as opposed to the 'shiny' appearance of the RNAS Sopwith Triplane. This is a good example of how the aircraft would have looked on delivery without Squadron or Flight identification markings of any kind

undercoat. This should create brush marks in the paint/varnish/thinner mix that realistically represents the wood grain, and which dries quickly before the effect dissipates. It takes a little practice but is well worth the effort.

Camouflage in Service

During 1916, 'RFC Green' dope became the standard finish for all British aircraft operating in France and by the end of that year all aircraft were being delivered from the manufacturers in this condition. In the meantime most RFC and RNAS units were ordered to apply PC10 to existing clear-doped aircraft operating in France from July 1916, but it does seem likely that a number of aircraft already operating continued to be flown in their original clear dope for some time after this date.

It is often assumed that these changes in finish were achieved overnight but in reality it often had to wait for the opportunity of major repair or scheduled servicing before any extensive refinishing could be undertaken. Even so, photographs suggest that the application of PC10 was not always achieved in one go, as aircraft were seen with only the inboard half of the upper wings painted or the entire wing but not the fuselage and so forth.

The PC10 coating was to be applied to all upper surfaces of the wings and tailplane as well as the upper decking, sides of the fuselage and fin. The remainder of the airframe was left clear doped, which was essentially the undersides, where protection from the harmful effects of sunlight was of less significance.

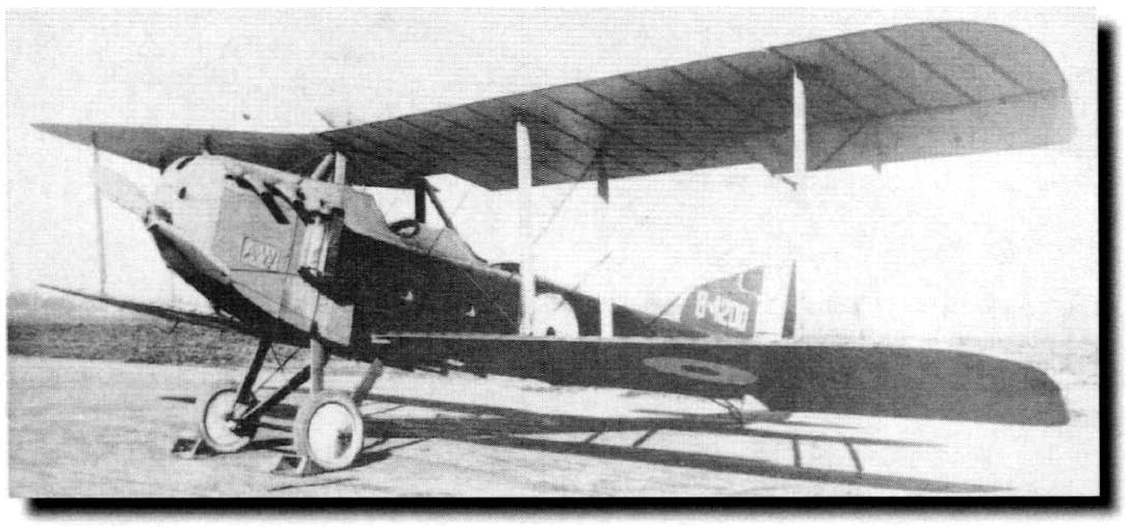
Variations did occur, perhaps due to misinterpretation of any official guidelines that may have been issued at the time. Cowlings for example were usually finished to the sub-contractors' whim and a great many variations on bare metal, grey and PC10 persisted until the final year of the war when a standardised all over PC10 finish for fabric, wood and metal work was introduced.

It is widely accepted that whatever colour the RFC aircraft were finished in it appears considerably lighter in shade during the early stages of its use, becoming slightly more glossy and darker as time went by. This may be due, in part, to the early batches of PC10 being mixed incorrectly at the Supply Depots in France, whereas those formulated in the UK were made to more stringent standards? The gradual darkening may also have been due to improvements made to the pigment quality coupled with a slight increase in the relative amount of Lamp Black added to the mix and my own experimental samples proved to be an acceptably close 'tonal' match when converted into b&w photographs.

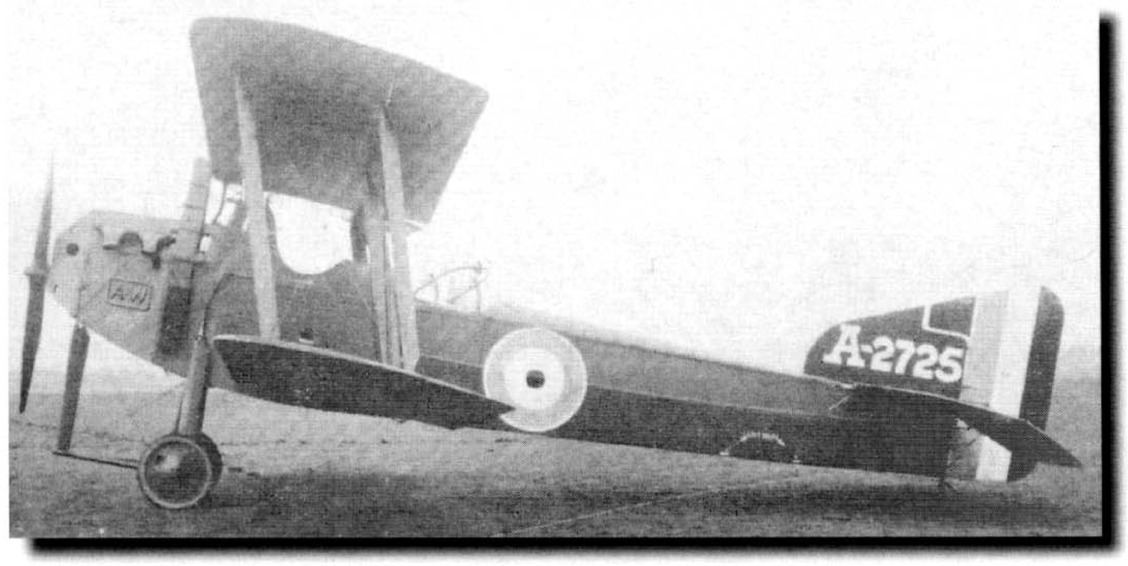
I accept that this is rather a simplistic experiment as it makes no allowance for the variation of photographic film types used during WW1 and today, but it did give me a rough idea of what might have been going on. Additional coats of varnish were sometimes applied at unit level and these may also have contributed to darkening the resultant shade, something that was especially noticeable on RNAS aircraft, although there is a limit to how much extra varnish can be applied to any fabric covered airframe before it would have to be recovered. I suspect that the RNAS got the transition from clear dope to camouflage correct a lot sooner than the RFC as very few of their aircraft appear in anything other than what appears to be a dark shade of PC10.

One minor detail often overlooked is that on many factory-finished airframes, the PC10 extended around the leading and sometimes the trailing edges of the wings and tailplane by up to two inches. This was not a universal feature but was seen on many S.E.5as and some Sopwith Camels. Once again this seems to have depended on the particular subcontractors' preference.

Initially PC10 was applied as an additional coat over pre-







Examples of three, Armstrong Whitworth F.K.8s

TOP B4200 was a rebuild carried out by the No 2 (North) Aeroplane Repair Depot and is typical of a late production model with 'V' strut undercarriage and side-mounted radiators. Note the apparently dark shade of PC10 with what are presumed to be grey cowlings. It is also interesting that the lower wing cockades are well inboard suggesting that early instructions for their positioning were still in force with the No 2 Depot! As with many AW F.K.8s the serial is in white and positioned on the fin

MID B240 is another Armstrong Whitworth built aircraft, but in this instance with the early type undercarriage and large 'church roof', radiators. In contrast to B4200, this particular example appears to have been finished all over in the same colour, which was presumably a slightly different shade of PC10 to that of the B4200. Although variations in film type may be a factor it seems unlikely given the consistency of the cockade 'colours'

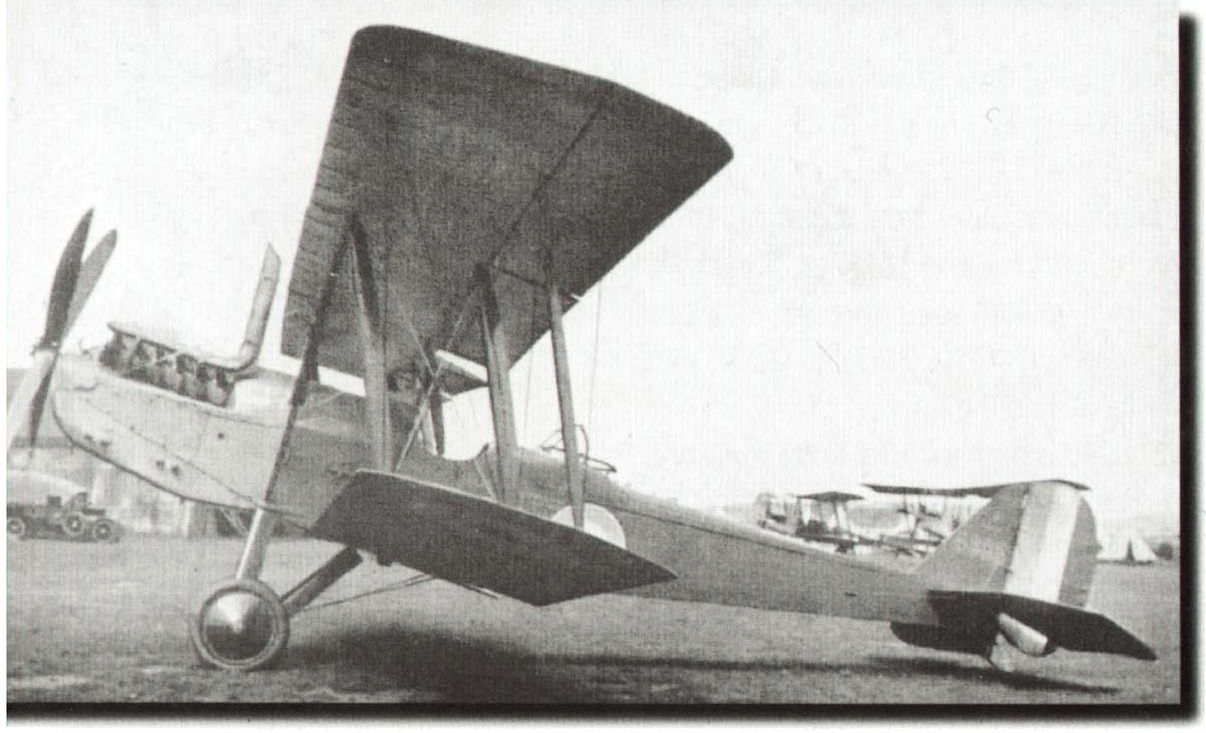
BOTTOM Another Armstrong Whitworth built F.K.8 with early style undercarriage and radiator. Here the contrast between cowling and fuselage is more distinct and it can be assumed that the cowling was almost certainly grey in this instance. Note the pale shade of the blue used on the fuselage cockade and rudder stripe

doped airframes but this was superseded by a specifically coloured dope intended to reduce the amount of preparation and re-coating required. It is often stated that this externally applied PC10 finish had a marked effect on the colour of the fabric interior. Unfortunately, this is often exaggerated as a fabric covered aircraft has to have its surface sealed before any pigmented finish can be applied, otherwise it would require excessive quantities of a heavier and more expensive coating simply to seal the fabric surface. As a rule, the inside of the fabric would have appeared darker because little or no light would have penetrated through the PC10-coated fabric, but the actual colour

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Examples of Royal Aircraft Factory aircraft

TOP This B.E.12e, distinguished from earlier variants by the underwing fuel tank and large dorsal fin, was built by the Coventry Ordnance Works and appears to have a grey cowling with a PC10 finish to all the other upper surfaces. Note that the blue of the cockades and rudder stripes appears very much darker than on other examples

MID Another B.E.2e but in this instance a rebuild by the No 1 (South) Aeroplane Repair Depot. The cowling on this aircraft appears to be somewhat darker than on the previous early example and it is thought that these were finished in PC10. Note that the serial number is in black with a white border and positioned on the fin

BOTTOM This R.E.8, (which replaced the B.E.2s RFC in service), was built by the Coventry Ordnance Works under contract No 37/A/727 and has what appear to be a grey cowling with PC10 airframe upper surfaces. Note that on all three of the Royal Aircraft Factory aircraft, the lower wing cockades are positioned well outboard unlike those on the AW F.K.8s

value, as viewed in direct light, would have been closer to that of ordinary sealed linen with only a slightly grey/green undertone.

Putting it into modelling practice

My own recipe for a colour that most closely matches the results of my experiments is to mix Humbrol 94 Matt Brown Yellow, (about as close as Humbrol gets to a true Yellow Ochre), with varying amounts of black. Start with a ratio of 4 parts of 94 to 1 part 33 Matt Black for aircraft finished at unit level during 1916, working up to a one to one ratio of 94 and 21 Gloss Black for later 'darker' finishes. I recommend the substitution of the Gloss Black as it helps to simulate the glossier surface of the later finishes without being too shiny in model form.

Another possibility that will produce closer duplication of Bruce Robertson's mixture is to mix 16 parts 63 Matt Sand, 12 parts 170 Brown Bess, 1 part 70 Matt Brick Red and 1 part 15 Gloss Midnight Blue. This is a rather complicated mixture along the Humbrol Colour System lines. Personally I would reduce this down to 16 parts 63, 12 parts 170, 1 part 70 and 1 part 15 as it produces a very similar shade and makes mistakes much less likely.

It is all very much a case of aiming for a 'muddy' sort of green that looks as if it would stand up to comparison with the tonal values of black and white photographs. The beauty of it all is that no one can actually say that they 'know' it is wrong. A simpler and far less pedantic solution is to accept that colour interpretation is objective and that there are limitations to its reproduction and opt for variations on No 86 Matt Light Olive, No 150 Matt Forest Green, No 159 Matt Khaki Drab and just sort of 'wing it'!?!

PC12 and other stuff

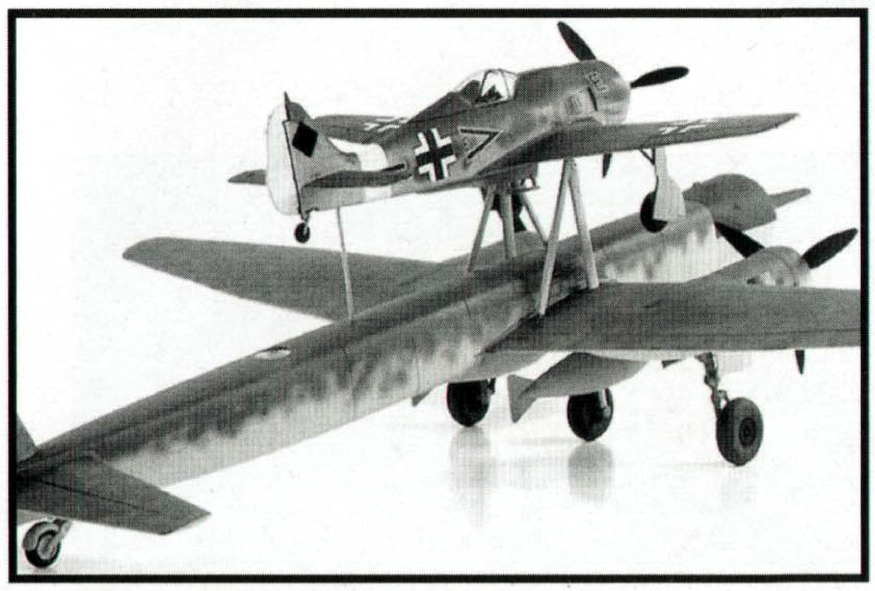
As far as I can tell, the only alternative British Protective Aircraft Finish, which was designated PC12, seems to have been a deep red/brown and appears to have been made using only the red form of Ferrous Oxide and perhaps a small amount of Lamp Black, being formulated especially for use on aircraft operating in the Middle East, as this was found to offer greater protection against the harmful effects of stronger sunlight and where a 'Green Camouflage' was less of a necessity. The best Humbrol equivalent I can think of is probably 70 Matt Brick Red with a dab of black?

Another exception was the application of 'Night' finishes to certain nocturnal aircraft. Royal Aircraft Factory F.E.s operated by Night Flying units were seen painted with a very 'sooty' black, presumably derived from Lamp Black, suspended in a dope finish. Unfortunately this was inclined to rub off on anything, and anyone, that came into contact with it and proved rather unpopular with ground crews in particular. I can of think of no better substitute for this 'night' finish than Humbrol 33 Matt Black.

Experimentation suggested that an overall coat of PC10 RFC Green was not only just as effective as a 'night' camouflage, but some experts suggested it was even better and it was certainly far more economically expedient for this purpose. So, we subsequently see pictures of Royal Aircraft Factory F.E.2s and Handley Page 0/400s finished in all over PC10. Later a specific 'night' camouflage for bombers was developed based on the PC10 experience which was a deep Olive Green designated NIVO, but its use seems to post-date the WW1 period. AM

Paul concludes his fascinating two-part feature on the surface finishes applied to British Military aircraft in the 1914-18 War in next month's issue with a look at the development of national markings, serial numbers and squadron identification markings. Don't miss it! Order your May issue copy of 'Model Aircraft Monthly' NOW!

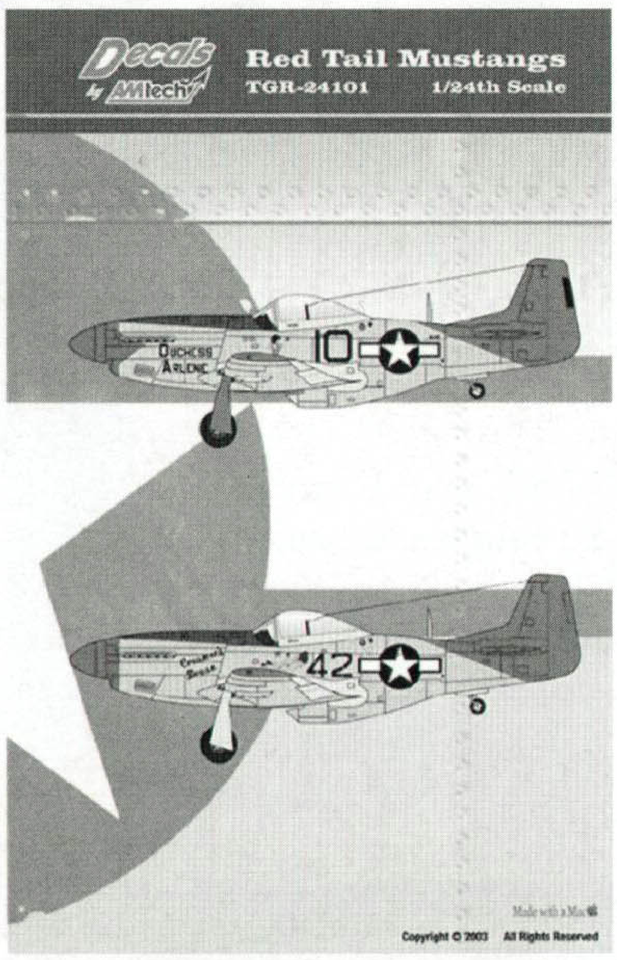
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De Havilland Aviation's Sea Vixen and friends

Dear Neil,

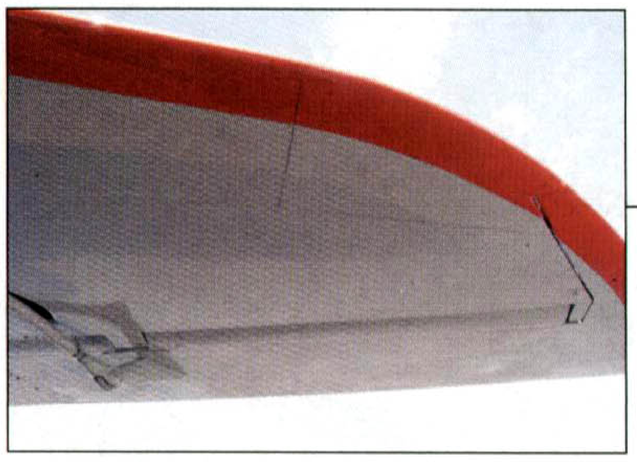
Following Steve Screech's Sea Vixen article in the October 2003 (Vol 2/10) issue of 'MAM', I thought your readers might be interested in photos of de Havilland Aviation's Sea Vixen XP924 flying with Sea Harriers, taken at the 2002 Press Day prior to Yeovilton's Air Day. The Sea Vixen was escorted back into its former base at Yeovilton by two No 899 NAS Sea Harriers, one of which is an ex-Falklands veteran. The Sea Vixen, XP924/G-CVIX, served its entire operational career with No 899 Squadron, hence the association.





This was the first time that the Sea Vixen had flown with the Sea Harriers. Currently the Vixen is the only flying historic Navy jet. The welcome to Yeovilton was completed with a four-ship formation overflight down the main runway by the Sea Vixen, two Sea Harriers and a Navy Hawk. The Sea Vixen was flown up from its Bournemouth base by Brian Grant, but is owned by Gwyn Jones and operated by de Havilland Aviation.

Also enclosed are some Folland Gnat detail photos depicting XR538, owned and operated by Delta Jets from Kemble. The aircraft was returned to its authentic former No 4 FTS colours in early 2002. This Gnat is in excellent condition and now flies regularly at displays and on pilot training flights. One non-authentic feature of this machine is the installation of smoke generator pipes under the tail. No 4 FTS Gnats of course did not have this feature. AM





Tim Skeet
De Havilland Aviation, Wimbledon, London

Thai Bronco

Dear Neil,

I thought the enclosed photo might interest some of your readers looking for an unusual and very eye-catching conversion project!?! Taken at the Royal Thai Air Force Museum in Bangkok, it shows the one-off RTAF-5 turboprop trainer/FAC aircraft which first flew in October 1984. Several sources claim it as an entirely original design, but the inspiration and several major components almost certainly came from the Rockwell OV-10 Bronco. I believe more details can be found in the 1984/85 Janes.

The museum itself is adjacent to Don Muang International Airport and other gems include the world's only surviving Vought Corsair biplane, an RTAF-4 Chantra, (converted Chipmunk), and indigenous Boripatra general purpose biplane.

Entrance is free, and there is a gift shop run by a charming young lady selling, (amongst other things), the excellent Siam Scale decal range, and best of all, you can actually climb inside some of the aircraft parked outside. Highly recommended to any aircraft enthusiast thinking of holidaying in the magical Kingdom of Thailand this year. AM



John Horton
Lincoln, Lincolnshire

The difference of LERX



Dear Neil,

I wondered how many of your readers were aware of the different types of LERX on the RAF Harrier GR.5/7 Fleet. The following summarises my current knowledge on the subject.

The accompanying photos show Harrier GR.7, ZD432/N of No 20(R) Sqn., that I photographed at Boscombe Down on 14 June 1992. It has 65% LERX. The black spot above the LERX is the engine bay venting air intake.

Incidentally, this photograph illustrates a point missed by most reviewers of Harrier GR.5/7 kits. Kit manufacturers usually mould the LERX as a simple extension of the wing, giving it the same anhedral. If you examine this photo of ZD432/N and the one of ZD408/37, taxiing out at Cottesmore on 21 July 1999, you will see that this is not the case. The LERX has a shallower anhedral angle than the wing. I cannot think of any review in the mainstream magazines that has picked up that point.





Anyway, back to the LERX. The larger 100% LERX is quite different from the 65% version, being more of a 'fairing' than a 'flat plate' as you can see from the close-up photo of the port side intake on ZG533/87 from No 3 Sqn., which I took at Farnborough in September 1996. A consequence of the shape of the 100% LERX is that the engine bay intake vent on the wing leading edge is covered up and so Harriers with the larger 100% LERX have two 'horn' intakes on the upper fuselage to allow engine bay venting. If anyone is going to produce a 100% LERX conversion, they will also have to provide the horn intakes.

The next point to consider is exactly which Harriers have the 100% LERX?

The following were built as Harrier GR.5s
ZD318 - ZD319Build Nos DB1 - 2
ZD320 - ZD330Build Nos P1 - P11
ZD345 - ZD355Build Nos P12 - P22
ZD375 - ZD380Build Nos p23 - p28
ZD400 - ZD412Build Nos P29 - P41

The following were built as Harrier GR.5As
ZD430 - ZD438 Build Nos P42 - P50
ZD461 - ZD470 Build Nos P51 - P60
ZG471 - ZG480 Build Nos P61 - P70

The following were built as Harrier GR.7s
ZG500 - ZG512 Build Nos P71 - P83
ZG530 - ZG533 Build Nos P84 - P87
ZG856 - ZG862 Build Nos P88 - P94

NB: Note that the 'Build Numbers' are the same as the two-digit fin codes currently being carried by the Harrier Fleet.

Only the last eighteen GR.7s came off the production line with the 100% LERX installed, ie ZG506/77 to ZG862/94 inclusive. Most reference sources state that all the RAF Harrier Fleet will be converted to have the 100% LERX but the reality is that very few aircraft seem to have been so converted. The bulk of the Harriers were built as GR.5/5As and all the surviving airframes have been upgraded to GR.7 standard, but the 100% LERX were not added as part of that upgrade. In fact I can find very few examples of Harriers which have had the 100% LERX added, namely ZG477/67, photographed at IAT Fairford 2003; ZG504/75 - photographed at IAT Cottesmore 2001; and ZG505/76 - Aviation Workshop's '*Operation Telic*' book. The reality is that I don't think that many RAF Harriers have the 100% LERX other than those which were built with it.

What I have said so far only applies to the single-seat aircraft. As far as I am aware the T.10s all have the 65% LERX as exemplified by ZH664/112 of 4 Sqn, which I photographed at Cottesmore on 21 July 1999. Again you can see the engine bay intake in the wing leading edge above the LERX, but it also has the 'horn' intakes on the upper fuselage. I have checked all my T.10 photos and this configuration appears to be standard for this variant. There are several detail differences between the GR.7 and the T.10 and this appears to be one of them. AM

Roderick McQueen
Edinburgh, Scotland



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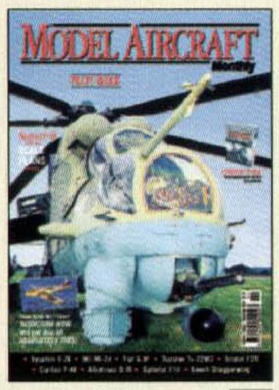
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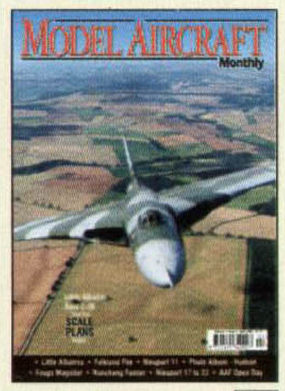
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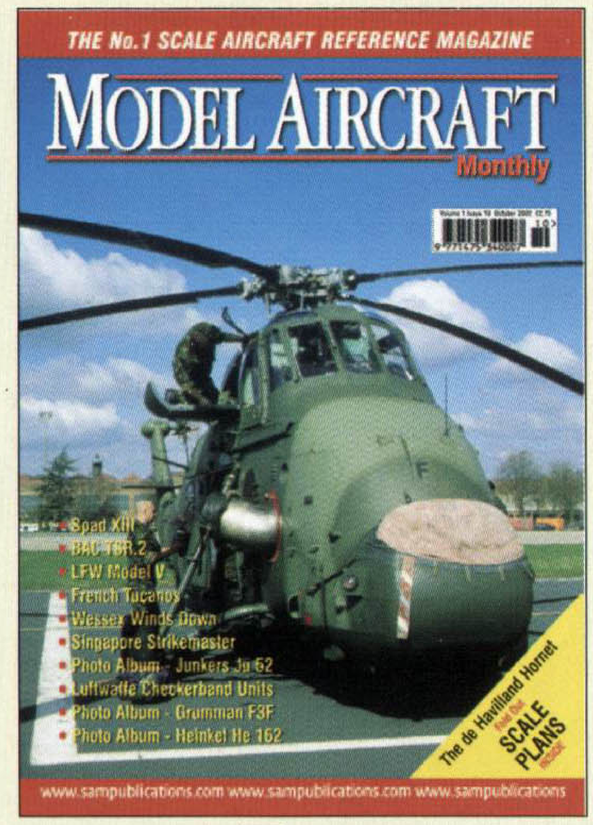
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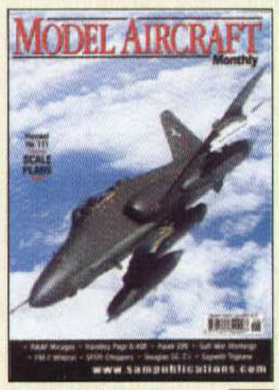
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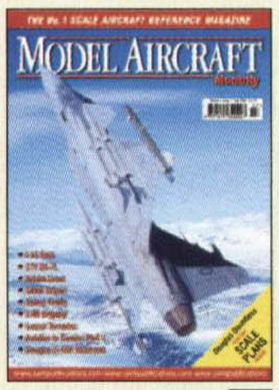
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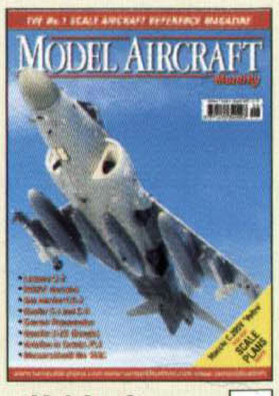
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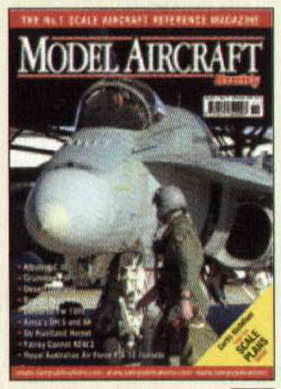
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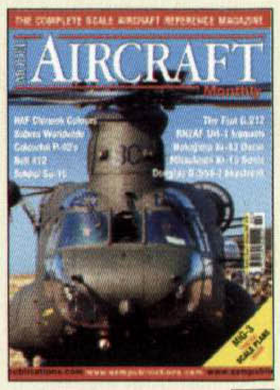
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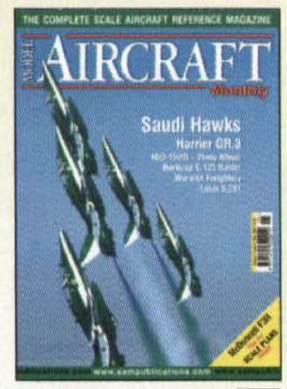
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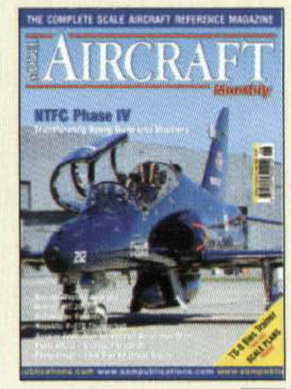
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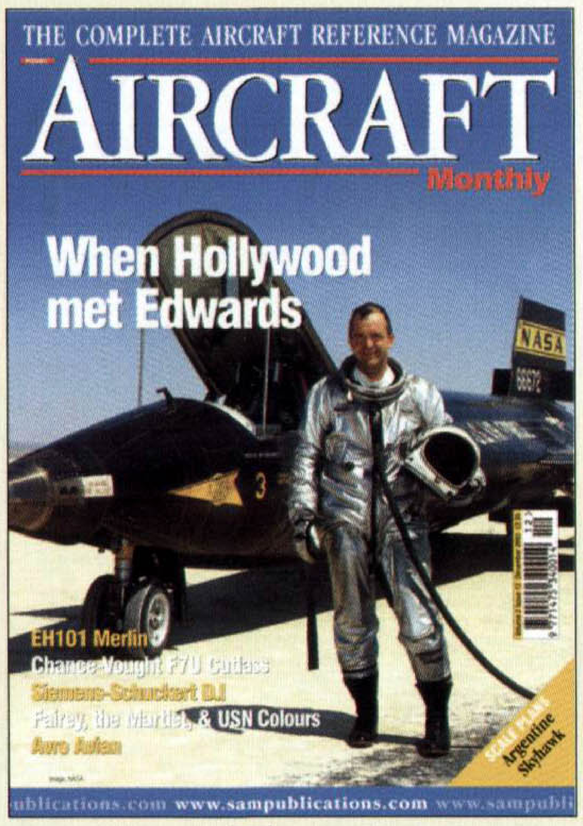
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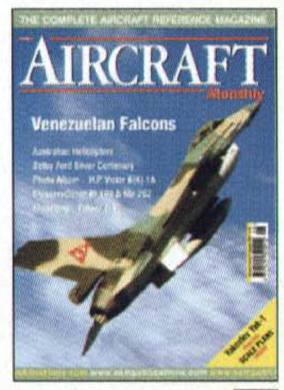
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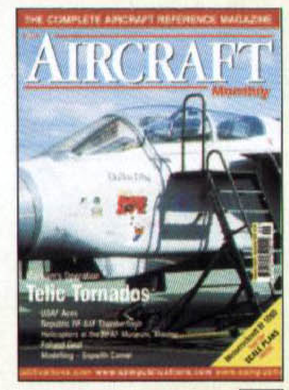
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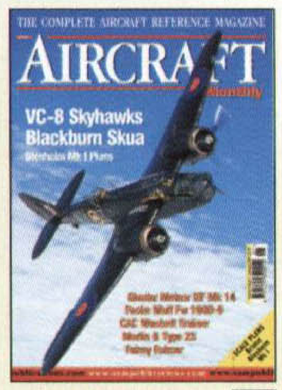
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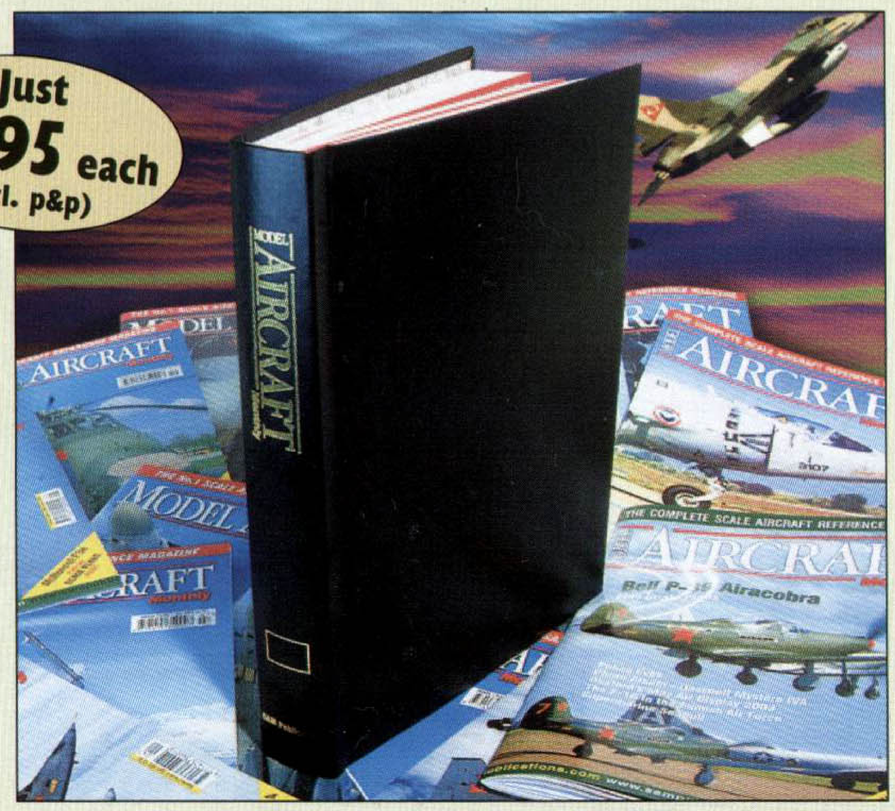
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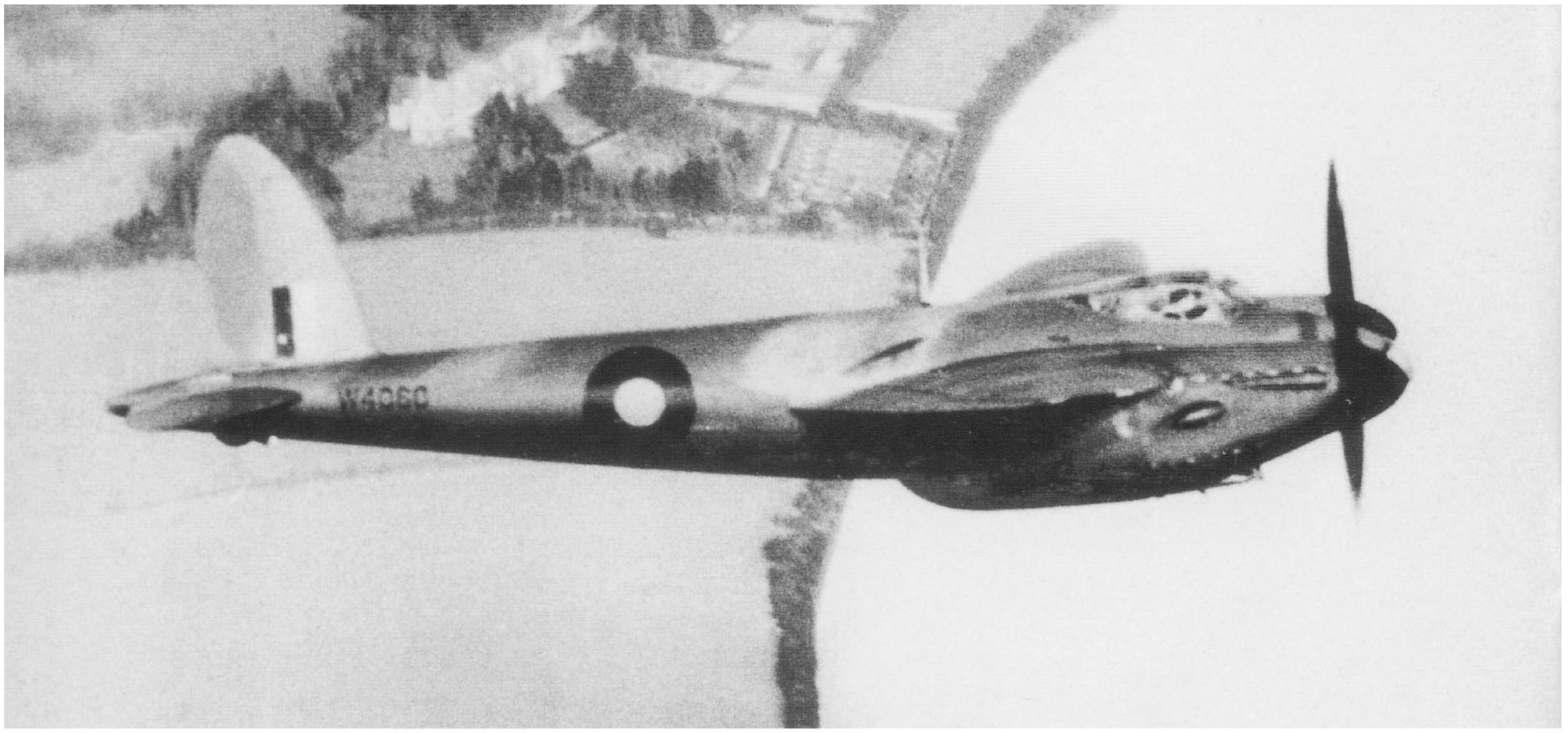
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Mosquito

PR Mk I and B.IV series (i) – early colour schemes

Paul Lucas describes the changes in the colour schemes applied to the initial delivery Photo Reconnaissance and Bomber, Merlin 21 engined 'short nacelle' series (i) Mosquitoes

THE STORY OF HOW THE DE HAVILLAND MOSQUITO was originally conceived as an unarmed high speed bomber/reconnaissance aircraft and was developed against a backdrop of official indifference, if not outright hostility, before going on to be one of the first truly multi-role combat aircraft has been told many times before and needs no retelling here. However, the camouflage and markings applied to the early Reconnaissance and Bomber Mosquitoes have received much less attention over the years and with the passage of time, much information appears to have been lost leaving some unanswered questions and intriguing possibilities.

The Mosquitoes which are examined here are the PR Mk Is in the W4054 to W4063 serial number range and the PRU/Bomber Conversion Type in the W4064 to W4072 serial number range which are usually described as B Mk IV series (i), all of which were built with the original 'short' engine nacelles and No 1 Tailplane.

Into service

The Mosquito first entered RAF service when the Mosquito PR.I began entering service with the Photographic Reconnaissance Unit (PRU) at Benson in July 1941, whilst the first Mosquito bombers to enter RAF service were with No 105 Squadron in November 1941.

During the period July to November 1941, there were two official documents which laid down the regulations for the camouflage and marking of RAF aircraft. The first of these was Directorate of Technical Development (DTD) Technical Circular No 144, which was issued by the Ministry of Aircraft Production (MAP) to the aircraft manufacturers in March 1941, whilst the second was Air Ministry Order (AMO) A.513 which was promulgated to the RAF by the Air Ministry on 10 July 1941.

DTD Technical Circular No 144 was intended to be used by the aircraft manufacturers as a guide to the camouflage and markings which were to be applied to aircraft on the produc-

TOP Mosquito PR Mk I, W4060 of No 1 PRU in the Medium Sea Grey and Olive Grey upper surfaces and PRU Blue under surfaces scheme with the modified Red/Blue national markings

tion line, whilst AMO A.513 set out the camouflage and markings which were to be carried by RAF aircraft in service. In theory, the two sets of regulations should agree, but in practice this was not always the case as the production painting of aircraft could, and did, lag behind the latest operational requirements of the Service. Nowhere is this more evident than with the Mosquito during 1941 and 1942.

The Mosquito PR.I

When the question arose in early 1941 as to what camouflage scheme should be applied to the Mosquito PR.I, de Havillands had no information as to what camouflage scheme was to be applied. The capability and expertise which had been built up during the 1914-1918 was allowed to wither away and it was not until Hitler's rise to power in 1933 that the failings in the RAF's photographic reconnaissance capability began to become apparent, and by 1938, the situation was becoming critical and a remedy was sought. A meeting was held at the Air Ministry on 22 March 1939, where the decision was taken to form an experimental unit for the purpose of testing and developing what were then considered novel techniques for making photo reconnaissance sorties over enemy territory, based on the use of skilfully camouflaged high speed aircraft as suggested by a Mr F S Cotton.

It has been claimed that for some time prior to this, Sidney Cotton had been involved in carrying out clandestine photography whilst engaged on what were ostensibly legitimate flights over Germany and Italy on behalf of Britain's Secret Intelligence Service. The aircraft used on these flights are said to have been painted a very pale green colour which did not look out of place on a civil aircraft, but at the same time happened to be very good at visually concealing the aircraft from observers on the ground.

As a result of this decision, the Photographic Development Unit (PDU) was established at Heston. In its original form, the PDU appears to have been a civilian organisation working under contract to the Air Ministry, but this arrangement seems to have come to an end on the outbreak of war as the PDU was absorbed into the RAF on or about 22 September 1939. In recognition of the work he had done in establishing both the Unit itself and pioneering the photographic techniques it employed, Sidney Cotton was given the substantive rank of Squadron Leader, (acting Wing Commander), and became the PDU's Commanding Officer.

Early in October 1939, the PDU was placed under the control of Fighter Command and fierce lobbying by the PDU eventually saw a Spitfire delivered which was modified for the Photographic Reconnaissance role. Finished overall in a glossy duck egg green colour which had been developed by Sidney Cotton who called it 'Camotint', this aircraft was dispatched to France in early November 1939 supported by a Hudson and a Lockheed 12A, collectively known as the Special Survey Flight. The Spitfire successfully carried out a number of experimental operational flights conclusively proving that the concept of an unarmed reconnaissance aircraft which relied on speed and camouflage for success worked. As a result of this, at the end of November 1939, the Chief of the Air Staff decided that the PDU should be expanded.

The expansion saw the PDU obtain more Spitfires along with the introduction of a new camouflage colour. Like the duck egg green 'Camotint' before it, the new colour was obtained directly from Titanine and was quite glossy. It apparently went by the name of 'Cosmic' in the Titanine catalogue and was a darkish blue grey with a hint of green about it, with eyewitness accounts indicating that this new blue colour first began to appear on Spitfires in February 1940. On 8 July 1940, the PDU was renamed the Photographic Reconnaissance Unit (PRU) and it is thought that it was at about this time that the PRU was allocated the two letter code combination 'LY' to serve as the unit identification marking.

The question of the comparatively strange colour schemes carried by aircraft of the PRU was one of the items on the agenda at a conference held at the Air Ministry on 23 July 1940, to consider aircraft colouring and markings with a view to achieving the maximum degree of standardisation. Ultimately it was decided that PRU aircraft should be excepted from any standard system of colouring and marking. This decision was circulated to the aircraft industry on 23 August 1940, and was notified to the Service on 12 December 1940.

Thus with no specific requirement for the camouflage of PR aircraft being laid down, de Havillands would appear to have had something of a free hand in applying a suitable camouflage scheme to the Photographic Reconnaissance Mosquito. By early 1941 however, a new operational requirement for aircraft camouflage was emerging.

On 5 May 1941, de Havillands wrote to the RAE at Farnborough to inform them that No 1 PRU at Benson had instructed them that the Mosquito was to be camouflaged in two colours, the first of which was a colour which fell mid-way between Dark Sea Grey and Light Slate Grey, whilst the second colour was to be sea green. The reference to 'sea green' was an error of some kind as it was agreed with de Havillands on 6 May that this colour should in fact be Medium Sea Grey. However, the colour which was to be mid way between Dark Sea Grey and Light Slate Grey was not an error and was, in fact, a 'new' colour which had been developed by the RAE in response to the emerging operational requirement for revised aerial camouflage.

This 'new' colour had been developed by the RAE in response to a change in tactics by the *Luftwaffe* who were operating at much greater altitudes than previously. The RAF's Day Fighter pilots began to report that the Dark Earth/Dark Green/Sky camouflage finish applied to their fighters appeared to be too dark for the altitudes at which they were now flying and fighting, and as RAF aircraft were now perceived to be operating under a tactical disadvantage due to their camouflage scheme, on 26 March 1941 Fighter Command requested that camouflage trials be carried out by the Air Fighting Development Unit (AFDU) at Duxford with the assistance of the RAE.

It is thought that these AFDU/RAE trials had a direct bearing on the camouflage finish applied to the Mosquito PR,I because on 5 May 1941, the same day that de Havillands wrote to the RAE informing them of the PRU's choice of camouflage scheme, they were visited by Wg Cdr Campbell-Orde, the AFDU's CO, in one of the Trials Scheme Spitfires, thought probably to have been finished in Medium Sea Grey and Olive Grey upper surfaces with Sky Blue under surfaces.

It is said this aircraft was examined by de Havilland's staff who were informed that small quantities of the necessary colours could be obtained for the first Mosquito from the RAE. Subsequently, de Havillands requested that the RAE dispatch to them 5 gallons of Olive Grey and 5 gallons of 'sea green' which should, of course, have read 'Medium Sea Grey'. No reference is made in any documents seen by the author to the colour to be applied to the under surfaces, but as it would appear that Trial Scheme on AFDU's visiting Spitfire was being adopted for the Mosquito PR Mk I, it would most probably

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have been Sky Blue. At the time of writing, no Standard or sample of Olive Grey has come to light so the exact hue of this intriguing colour remains a mystery.

The basic camouflage scheme which was applied to the Mosquito PR.I was to what DTD Technical Circular 144 termed 'Pattern No 1', which was defined as being where the uppersurfaces including the fin and rudder were camouflaged in a two-colour disruptive pattern with the single colour under surface the boundary of which was delineated by a line drawn at a tangent of 60 degrees along the lower sides of the fuselage.

The disruptive pattern applied to the upper surfaces was that called for in Aircraft Design Memorandum No 332 (issue 3) which quoted Air Diagram 1159 'Camouflage Scheme for Twin Engined Monoplanes - Bombers, Torpedo Bombers, General Reconnaissance Land Planes Troop Carriers and Bomber Transports (all of span less than 75 ft)'. This was the camouflage pattern originally drawn up and applied to the Blenheim from 1937 onwards. The only change to this stipulated by DTD Technical Circular No 144 was that the previous practice of applying the mirror image A and B schemes shown in the Air Diagram to alternate aircraft on the production line was no longer required. Either the A or the B Scheme was to be adopted at the aircraft manufacturer's discretion for continuous application to all aircraft and the MAP was to be notified of the choice. De Havillands appear to have opted for the A Scheme on the Mosquito PR.I substituting Olive Grey for Dark Earth and Medium Sea Grey for Dark Green as shown on the Air Diagram.

On the fuselage, the demarcation line between the upper and under surfaces approximately followed the 60 degree tangent line, but on the engine cowlings the demarcation between the upper and under surface camouflage was positioned approximately half way down the sides of the engine cowlings and extended along the cowling under the wing leading edge before sweeping forwards and up to meet the wing leading edge.

The unusual combination of camouflage colours is very apparent in photographs of W4051 where the odd looking washed out tones of the upper surface camouflage which appears to have a very soft edge, contrast sharply in tone with the very light colour of the under surfaces. Photographic evidence suggests that this scheme was applied to all of the PR Mk Is on the production line and, as it is known that the RAE was able to manufacture limited quantities of paint on its own account, it is thought likely that this is where de Havillands obtained their probably limited supply of Olive Grey paint.

The national markings were applied in accordance with the requirements of DTD Technical Circular No 144 which called for Red and Blue roundels on the upper surface of the wings, Red, White, Blue and Yellow roundels on the sides of the fuselage and the standard Red, White and Blue marking on the fin. No markings were carried on the undersurface of the wings.

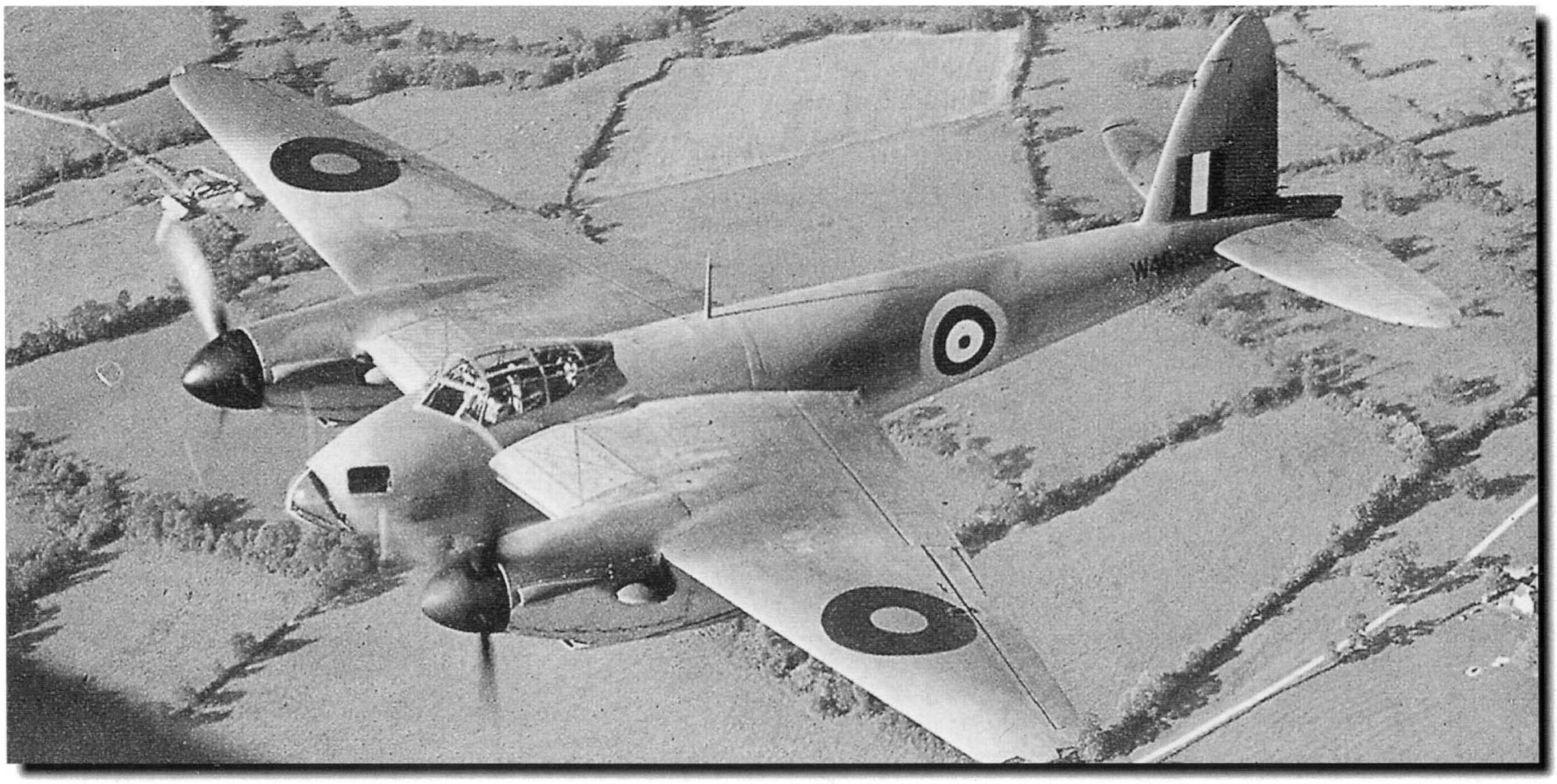
At this stage of the war it is thought that there were no officially laid down requirements as to the overall size of the roundels, although their proportions were specified in Air Diagram 2001. The upperwing Red and Blue roundels were to have Red centres with a diameter two fifths of the overall Blue diameter whilst the Red, White, Blue and Yellow roundel on the fuselage was to be proportioned 1-3-5-7 of the overall diameter. This appears to have allowed each aircraft manufacturer some leeway as to the size of roundels applied. De Havillands applied upperwing roundels of 54 inches diameter and fuselage roundels of 42 inches diameter.

The dimensions of the fin marking, which was comprised of 8 inch wide Red, White and Blue stripes, (with the Red stripe leading and applied parallel to the rudder hinge line), 27 inches high forming a rectangle 24 inches wide and 27 inches high. The aircraft serial number was applied to the rear fuselage in the usual place in 8 inch high Night characters. The spinners were finished in Night as were the propellers which were marked with the usual 4 inch wide Yellow tips.

It would appear that following delivery to the PRU, the camouflage scheme of the Mosquito PR Mk I was modified. Whilst the upper surface colours, Night 8 inch high serial numbers, Night spinners and 54 inch diameter Red and Blue roundel on the upper surface of the wings remained unchanged, the undersurface colour appears to have been altered from Sky Blue to Titanine's 'Cosmic' which is known to have been obtained direct from the company by the PRU by local purchase. When 'Cosmic' was applied, it was brought



ABOVE Mosquito PR Mk I, W4051, now coded LY•U and serving with No 1 PRU. Note that the Sky under surfaces have been repainted, in service, in PRU Blue
OPPOSITE Mosquito PR Mk I, W4051, in its original delivery scheme of Medium Sea Grey and Olive Grey upper surfaces with Sky under surfaces. Propeller spinners were Night



approximately half way up the side of the fuselage following a line from the trailing edge of the mainplane to the leading edge of the tailplane and forward from the leading edge of the mainplane to the nose, whilst on the engine nacelles, the colour was extended up to the panel line just above the air intake, to what might be described as Pattern No 2.

The fuselage roundels were also modified from the usual 42 inch diameter 1-3-5-7 proportioned Red, White, Blue and Yellow roundel to an equally proportioned 42 inch diameter Red and Blue roundel, apparently by the simple expedient of extending the Red centre outwards to cover the white portion of the roundel and extending the Blue portion over the Yellow outer ring. The fin marking appears to have remained unchanged from the standard 27 inch high and 24 inch wide equally proportioned Red, White and Blue flash. No 1 PRU's 'LY' codes and the individual aircraft letter appear to have been applied to the fuselage in either Sky or Sky Grey.

It is not currently known exactly when the fuselage roundels were modified and 'Cosmic' was applied to the under surfaces, so it is not known if any of the Mosquito PR.Is ever operated in their delivery scheme with 1-3-5-7 proportion roundels and Sky Blue under surfaces. In October 1941, Titanine's 'Cosmic' was officially adopted by the RAF and named 'PRU Blue' after which it became a standard camouflage colour available from Stores in the usual way. At about the same time as this was done, Coastal Command, who by this time had become responsible for the PRU, accepted 'PRU Blue' as being satisfactory as an overall finish for high-flying Photographic Reconnaissance aircraft. The overall PRU Blue scheme was therefore introduced sometime in 1942, so that by December 1942 it had become the standard scheme for high-flying Photographic Reconnaissance aircraft. As such, it was applied to the vast majority of PR Mosquitoes of all Marks, including the PR Mk Is which survived long enough to receive it.

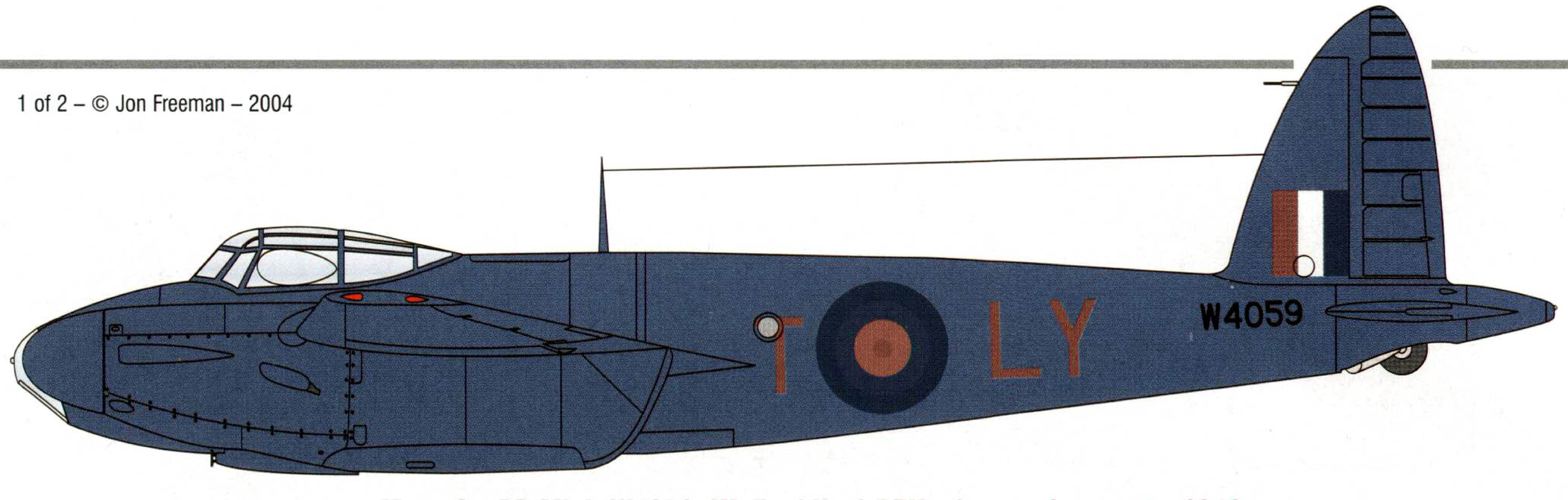
Mosquito PRU/Bomber conversions B.IV series (i)

Unlike the Photographic Reconnaissance aircraft, the camouflage and markings which were supposed to be applied to Day Bombers were set out in official documents. AMO A.513/41 stated that 'RAF Landplanes, Operational aircraft for service at home' were to be camouflaged using the Temperate Land Scheme which consisted of Dark Green and Dark Earth upper surfaces whilst the under surfaces were to be either matt black which was a colloquial name for Special Night or duck egg blue which was a colloquial name for Sky.

This Air Diagram showed two disruptive patterns, one the mirror image of the other, termed the 'A' and 'B' Schemes each of which consisted of two colours, Dark Green and Dark Earth, which when used together in this manner were collectively known as the Temperate Land Scheme. De Havillands appear to have opted for the 'A' Scheme on the Mosquito B IV series (i)s just as they had on their PR Is, but this time retaining the Dark Green and Dark Earth on the upper surfaces. The demarcation lines of these two colours ran across the airframe diagonally without stopping at any important structural point in an attempt to break up the outline shape of the aircraft when seen at a distance. With regard to Day Bombers, such as the new Mosquito, DTD Technical Circular No 144 stated that the Temperate Land Scheme with Sky under surfaces was to be applied to Pattern No 1.

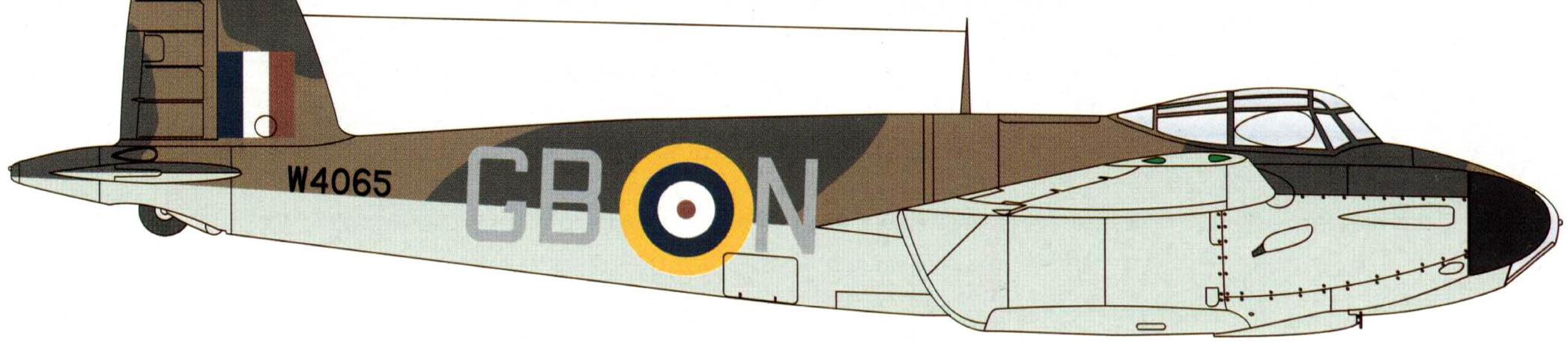
Whilst de Havillands were guided by the provisions of DTD Technical Circular No 144, the demarcation line between the upper and undersurface camouflage applied to the Mosquito B.IV series (i) did not really adhere to DTD Technical Circular No. 144s instructions in any respect. On the fuselage, the demarcation followed a line approximately half way up the fuselage sides between the trailing edge of the mainplane and the under surface of the tailplane, whilst forward of the mainplane the demarcation swept down from the leading edge of the mainplane in a curve which almost reached the bottom of the nose transparency. The demarcation between the upper and under surface camouflage on the engine nacelles followed the straight line formed by the panel line directly above the engine air intake. Unlike the PR Mk Is, the demarcation lines between the upper and under surfaces appear to have been quite sharp with little if any hint of overspray. The spinners were Night as were the propellers with the usual 4 inch wide Yellow tips.

The national markings were applied in accordance with the requirements of DTD Technical Circular No. 144 and appear to be identical to those applied to the PR Mk Is when



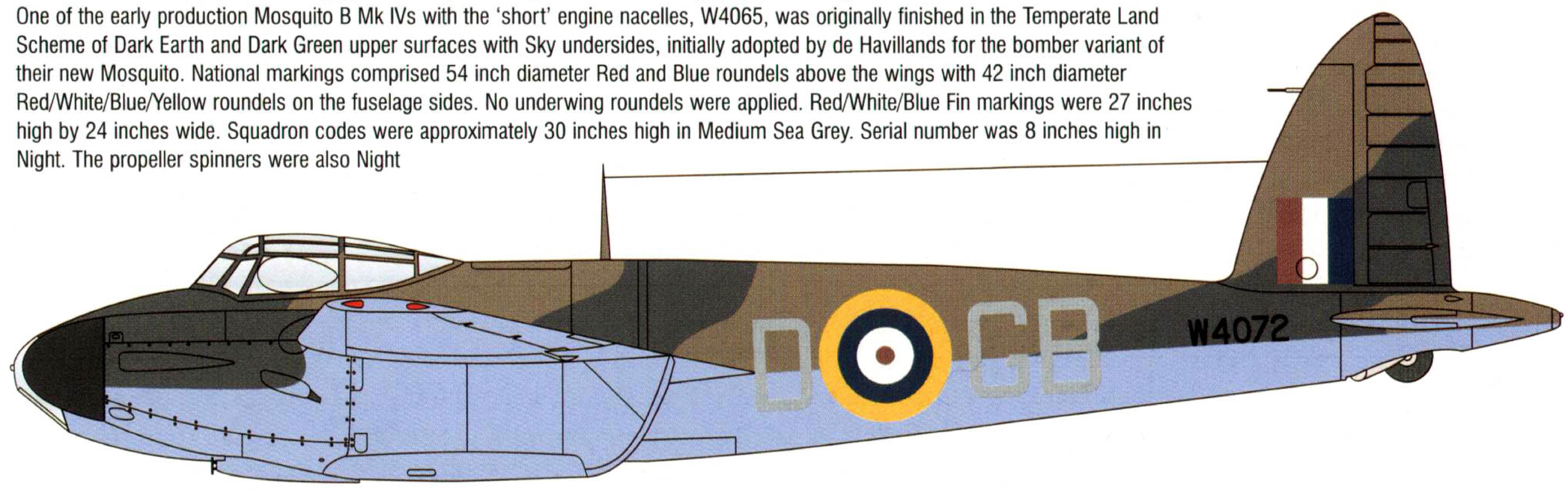
Mosquito PR Mk I, W4059, LY•T, of No 1 PRU, circa early summer 1942

One of the very early production Mosquito PR Mk Is, W4059 was repainted 'in service' in overall PRU Blue following that colour's introduction for all photo reconnaissance aircraft during 1942. National markings comprised 54 inch diameter Red and Blue roundels above the wings with 42 inch diameter Red/Blue roundels on the fuselage sides. (Note the different shades of the Red centre spot). Red/White/Blue Fin markings were 27 inches high by 24 inches wide. Squadron codes were approximately 24 inches high in Red. Serial number was 8 inches high in Night. The propeller spinners were also PRU Bluet



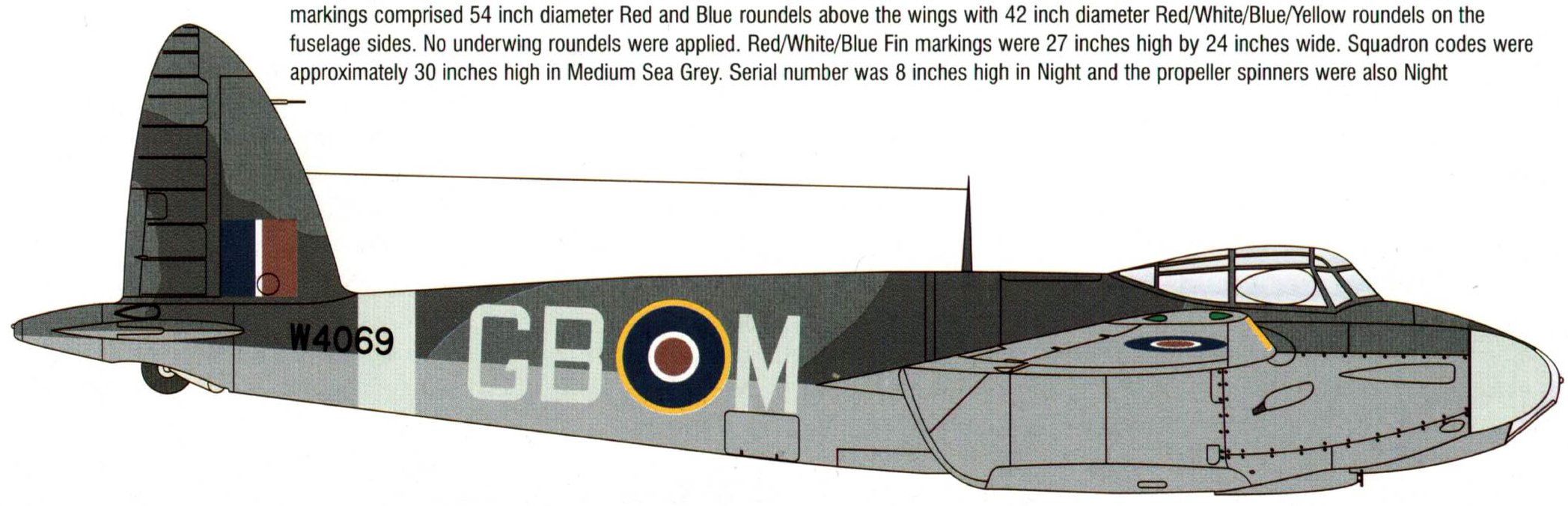
Mosquito B Mk IV series (i), W4065, GB•N, of No 105 Sqn, circa May 1942

One of the early production Mosquito B Mk IVs with the 'short' engine nacelles, W4065, was originally finished in the Temperate Land Scheme of Dark Earth and Dark Green upper surfaces with Sky undersides, initially adopted by de Havillands for the bomber variant of their new Mosquito. National markings comprised 54 inch diameter Red and Blue roundels above the wings with 42 inch diameter Red/White/Blue/Yellow roundels on the fuselage sides. No underwing roundels were applied. Red/White/Blue Fin markings were 27 inches high by 24 inches wide. Squadron codes were approximately 30 inches high in Medium Sea Grey. Serial number was 8 inches high in Night. The propeller spinners were also Night



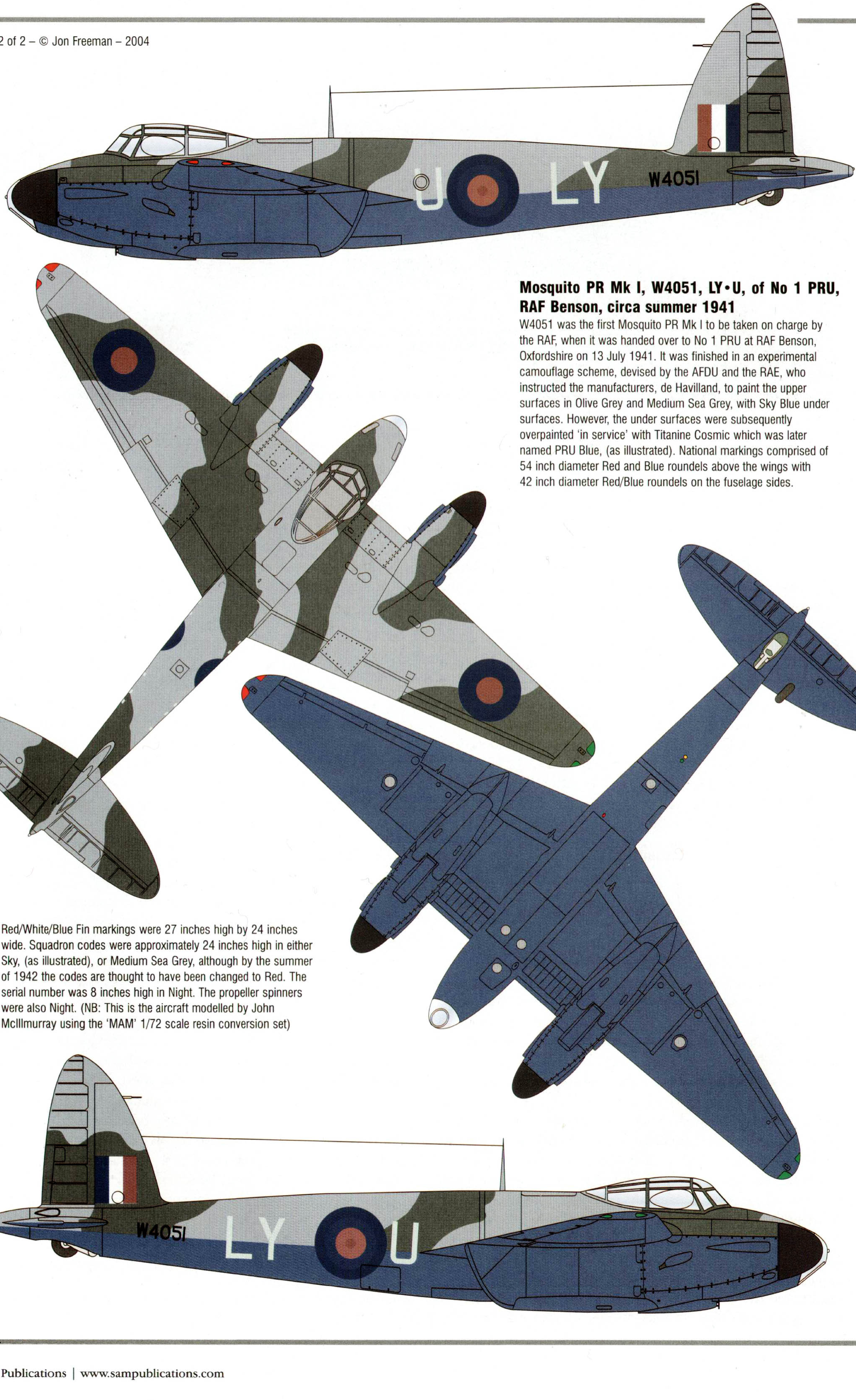
Mosquito B Mk IV series (i), W4072, GB•D, of No 105 Sqn, circa summer 1942

Another of the early production Mosquito B Mk IVs with the 'short' engine nacelles, W4072, is also finished in the Temperate Land Scheme of Dark Earth and Dark Green upper surfaces, but it is thought possible that the under surfaces were finished in Azure Blue. This scheme was suggested by the Air Ministry and agreed by 2 Group for bomber Mosquitoes, but it is not known for certain to have actually been adopted. Note the demarcation on the engine cowling which appears on a de Havilland Works Drawing and in a photo of the aircraft but was a short-lived feature. National markings comprised 54 inch diameter Red and Blue roundels above the wings with 42 inch diameter Red/White/Blue/Yellow roundels on the fuselage sides. No underwing roundels were applied. Red/White/Blue Fin markings were 27 inches high by 24 inches wide. Squadron codes were approximately 30 inches high in Medium Sea Grey. Serial number was 8 inches high in Night and the propeller spinners were also Night



Mosquito B Mk IV series (i), W4069, GB•M, of No 105 Sqn, circa late summer 1942

Following the decision to finish all 'Unarmed Bombers' in the same colours as Day Fighters, Mosquitoes were painted in the Day Fighter Scheme of Ocean Grey, (the original 1941 mixed version of seven parts Medium Sea Grey and one part Night), and Dark Green upper surfaces, with Medium Sea Grey undersides. Initially, Fighter Command-style Sky rear fuselage bands were applied with Sky spinners and yellow wing leading edges, (as illustrated), but these adornments had been dropped by the autumn. In May 1942, new National markings were introduced and whilst the 54 inch diameter Red and Blue roundels above the wings were retained, the fuselage roundels were changed to the new 36 inch diameter Red/White/Blue/Yellow National marking III style and for a short time Red/White/Blue National marking II underwing roundels were carried. The new 24 inch high by 24 inch wide, Red/White/Blue Fin marking (i) was also applied. Squadron codes were approximately 30 inches high in Sky. Serial number was 8 inches high in Night



Mosquito PR Mk I, W4051, LY•U, of No 1 PRU, RAF Benson, circa summer 1941

W4051 was the first Mosquito PR Mk I to be taken on charge by the RAF, when it was handed over to No 1 PRU at RAF Benson, Oxfordshire on 13 July 1941. It was finished in an experimental camouflage scheme, devised by the AFDU and the RAE, who instructed the manufacturers, de Havilland, to paint the upper surfaces in Olive Grey and Medium Sea Grey, with Sky Blue under surfaces. However, the under surfaces were subsequently overpainted 'in service' with Titanine Cosmic which was later named PRU Blue, (as illustrated). National markings comprised of 54 inch diameter Red and Blue roundels above the wings with 42 inch diameter Red/Blue roundels on the fuselage sides.

Red/White/Blue Fin markings were 27 inches high by 24 inches wide. Squadron codes were approximately 24 inches high in either Sky, (as illustrated), or Medium Sea Grey, although by the summer of 1942 the codes are thought to have been changed to Red. The serial number was 8 inches high in Night. The propeller spinners were also Night. (NB: This is the aircraft modelled by John McIllmurray using the 'MAM' 1/72 scale resin conversion set)



they left the production line, ie Red and Blue roundels on the upper surfaces of the wings of 54 inches diameter, with 1-3-5-7 proportioned Red, White, Blue and Yellow roundels on the fuselage of 42 inches diameter. The fin marking consisted of the 27 inch high by 24 inch wide rectangle made up of 8 inch wide stripes. No markings were carried on the under surface of the wings.The Service applied squadron codes and individual aircraft identification letters were to be applied using Medium Sea Grey to comply with the instructions given in AMO A.513/41.

This initial production scheme was applied at least as far as W4068, but there is a body of evidence which suggests that at some point in the production of the B IV series (i), the colour of the under surfaces might have been changed. If this change actually did occur, it would appear to have done so by the time W4072, the final Mosquito of this initial batch of bombers, was completed and delivered to No 105 Sqn on 27 February 1942.

The Air Ministry Directorate of Operational Requirements wrote to HQ Bomber Command on 12 January 1942 with reference to the subject of Mosquito camouflage. The letter stated that it would not be practicable to meet specific Command operational requirements for the application of the various camouflage schemes which each Command required on the production line. This was because at the time that the Mosquitoes would leave the production line there was no way of being able to accurately identify which Operational Command any individual Mosquito would ultimately be delivered to.

The letter suggested that one colour scheme should be applied on the production line to various generalised operational roles. In the case of Bomber Command's 'Unarmed Day Bombers', it was suggested that they should be considered to be in the same category and therefore have the same camouflage scheme as Long Range Fighters, Escort Fighters and Fighter Bombers. It was also suggested that the under surfaces of aircraft currently painted Sky should be finished in Azure Blue instead. The replacement of Sky with Azure Blue would be beneficial for two reasons. Firstly, it would give a better camouflage effect on aircraft operating from the UK over Northwest Europe as the camouflage colour Sky, being a pale grey-green, did not really match the colour of the sky; and secondly, the use of Azure Blue in lieu of Sky would greatly ease the work of Maintenance Command as Azure Blue was required for aircraft serving overseas.

The colour scheme recommended for the Mosquito day roles of Unarmed Bomber, Long Range Fighters, Escort Fighters and Fighter Bombers for application on the production line was therefore as follows:

i) Upper surfaces - Temperate Land Scheme, (Dark Green and Dark Earth)
ii) Under surfaces - Azure Blue
iii) Standard national markings for bomber aircraft
iv) Squadron and unit identification markings - dull red.

A meeting was called for 26 January 1942 to discuss this proposal at the Air Ministry to which a representative of Bomber Command was invited along with representatives of the other Operational Commands which it was thought would go on to operate the Mosquito. HQ Bomber Command evidently consulted 2 Group who was responsible for operating the Mosquito bombers about this proposal prior to the meeting. Evidence for this is to be found in a minute which was on file at HQ Bomber Command by 23 January 1942 stating that 2 Group had agreed that the Temperate Land Scheme and Azure Blue scheme was required on the Mosquito.

When the meeting of 26 January 1942 took place, the Fighter Command representative stated that as a result of operational experience, Fighter Command had decided on a camouflage scheme for their Mosquito Fighters which was a compromise in that it was effective from ground level to 30,000 feet. This scheme was known as the Day Fighter Scheme and consisted of the upper surfaces being camouflaged in Dark Green and Ocean Grey with the under surfaces being finished in Medium Sea Grey. The Bomber Command representative mentioned that the operational height of the bomber Mosquitoes would probably be anywhere between 21,000 ft and 25,000 ft. and that for this reason he thought that it might be possible for Bomber Command to accept the Fighter Command camouflage scheme. However, before any action could be taken on the matter, approval would have to be sought from HQ Bomber Command.

ABOVE Although not a PR Mk I, this Mosquito PR Mk IV, DK310, does show to advantage the positioning of the fuselage codes, LY•G, with the individual aircraft letter in front of the roundel on the port side

OPPOSITE Mosquito B Mk IV series (i), W4072, photographed in February 1942, finished in Dark Green and Dark Earth upper surfaces with what appear to be Azure Blue under surfaces? W4072 later served with No 105 Squadron and was code GB•D

The Fighter Command representative then went on to suggest that all Mosquitoes should also carry the Fighter Command special recognition markings which consisted of Sky spinners, tailbands and code letters and Yellow wing leading edge stripes. The reasons put forward for this suggestion were firstly that the enemy would thus be unable to distinguish an armed Mosquito from an unarmed Mosquito at a distance and thus have to treat all of them with the same degree of caution; and secondly, as the Mosquito was said to look very much like the latest type of twin-engined Messerschmitt, (the Me 210/410), these markings would assist in the identification of the bomber Mosquitoes by friendly forces.

It was stressed that these markings did not compromise the camouflage scheme at a distance as they were visible only at comparatively short range. The Bomber Command representative indicated that he thought this to be an excellent idea, but that once again, higher authority would have to be consulted before any action was taken. On 6 February, the Senior Air Staff Officer at HQ Bomber Command, Robert Saundby, agreed with the proposal to standardise the camouflage and markings of the Mosquito bomber with those of the day flying Fighter Command version and asked that the Air Ministry be informed to this effect.

9 February 1942 saw HQ Bomber Command inform HQ 2 Group of its decision on Mosquito bomber camouflage and gave the reasons for its adoption before going on to give details of the actual camouflage and marking scheme to be adopted. The camouflage was to be Dark Green and Ocean Grey on the uppersurfaces with the under surfaces being Medium Sea Grey. The markings were to consist of Sky spinners, squadron and individual aircraft identification markings and an 18 inch wide band around the fuselage immediately forward of the tail unit. Yellow wing leading stripes were to be applied and finally, standard national markings. Any aircraft which were already held on strength were not to be recamouflaged, but were to have the Fighter Command markings added. The Sky spinners and tailbands would be applied on the production line but the Yellow wing leading edge stripes would be applied by the operational units.

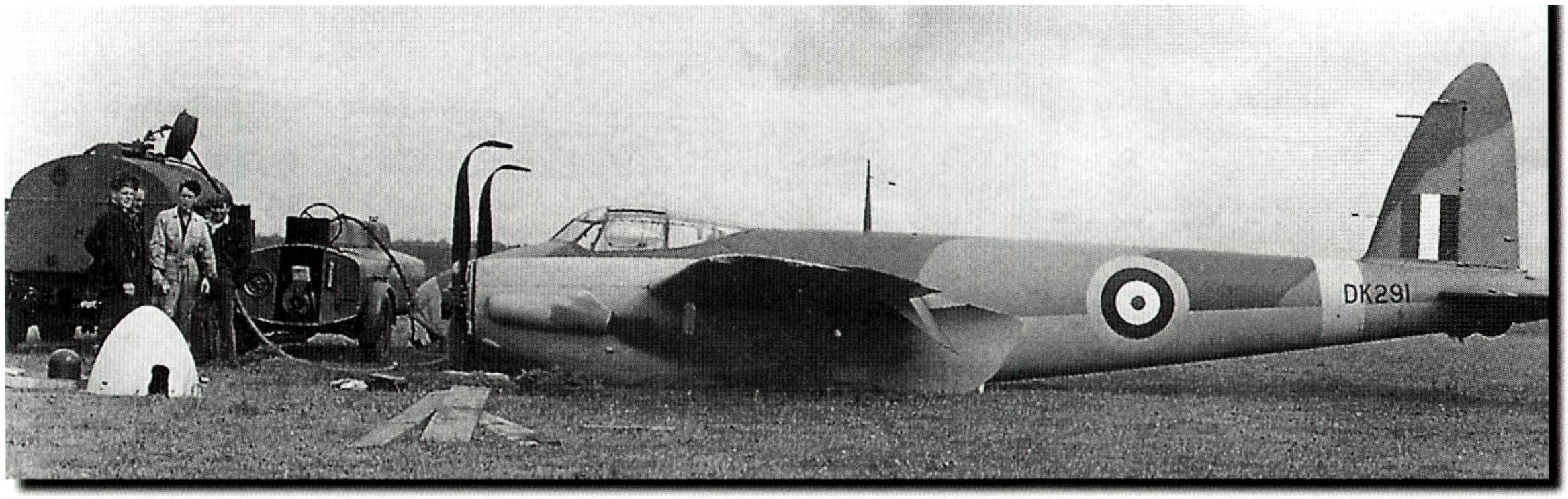
This camouflage and marking scheme was finally promulgated by the Air Ministry on 6 March 1942. Besides giving the details of the scheme which have already been covered, it also gave details of the Yellow wing leading edge stripes which were to be applied by the squadrons themselves. On the Mosquito, the Yellow stripe was required on the leading edge of the wing to within 3 feet of the outboard side of the engine nacelle. The width of the strip which was to be measured around the curve of the leading edge was to be 7 inches at the inboard end tapering to 3 inches wide at the wingtip with the centreline of the stripe being on the centreline of the leading edge of the wing.

Thus it would seem at first glance that the Dark Green, Dark Earth and Azure Blue scheme was never applied. However, as has already been mentioned, a change in the camouflage appears to have been made on the production line during the production of the later B.IV series (i)s in February. A contemporary photograph of W4072 shows the changes made in the demarcation line between the upper and under surfaces on the engine nacelles and on the nose. The upper surface camouflage follows a demarcation line which brings the upper surface camouflage approximately half way down the sides of the engine cowlings and extends along the cowling under the wing before sweeping up to meet the wing leading edge; whilst that on the nose now follows a straight line back from the nose transparency before sweeping up to meet the leading edge of the mainplane. The question that remains unanswered is what colour was actually applied to the under surfaces of the last few B.IV series (i)s? There is some anecdotal evidence that some of the early B.IV series (ii) s in the DK serial number range might have been finished with what has been described as a 'sky blue' colour on the under surfaces.

Whatever the colours actually applied on the production line were, following the decision to adopt the Fighter Command Day Fighter Scheme and despite the instructions that Mosquitoes in service were not to be repainted, most were - to some degree. Eyewitness accounts have stated that many of the Mosquito B IV series (i) aircraft which were delivered in the Temperate Land and Sky scheme had the Dark Earth segments overpainted with a dark grey and their Sky under surfaces overpainted with Medium Sea Grey.

As it is known that the decision had been made by HQ Bomber Command to adopt Fighter Command's camouflage and markings for the Mosquito, the most likely colour for this grey to have been was the same colour which was being used by Fighter Command at this time, the original 1941 shade of Ocean Grey. Service trials of the Olive Grey/Medium Sea Grey and Sky Blue scheme suggested by





AFDU had been carried out by No 56 Sqn who evidently found these colours to be unsatisfactory. Instead, following the final report on No 56 Squadron's trials, Fighter Command adopted what became known as the Day Fighter Scheme from 15 August 1941.

The instructions for the adoption of this scheme which were circulated on 8 and 12 August 1941 stated that upper surfaces were to be "dark green and dark grey camouflage" whilst under surfaces were to be "sea grey medium". The Dark Green areas of the upper surface camouflage were to remain untouched but the Dark Earth areas were to be replaced by a colour which was obtained by mixing seven parts Medium Sea Grey and one part Night. At the time that these instructions were issued the colour obtained by mixing seven parts Medium Sea Grey and one part Night did not have a name. The MAP wrote to the RAE on 11 August to inform them of the decision to adopt this colour whilst requesting that the RAE prepare Standards for the colour and to give it an appropriate name. The RAE prepared a number of Standards and on 21 August supplied them to the MAP having named the colour Ocean Grey.

The colour obtained by mixing seven parts Medium Sea Grey and one part Night was quite a dark grey which looked very similar to Dark Sea Grey. As this colour is now known to have been named Ocean Grey by the RAE in August 1941, the question arises as to why and when the hue of Ocean Grey changed to the much lighter, more blue hue which is known as Ocean Grey today and indeed is shown as Ocean Grey in the MAP Standards seen by the author. Why the change occurred is currently unknown but photographic evidence might suggest that it occurred sometime around the late spring or early summer of 1942. The earliest Mosquito B.IV that is known to have been finished in Ocean Grey as we know it today, Dark Green and Medium Sea Grey, on the production line, is DK328 which was completed some time around the middle of August, being delivered to No 105 Sqn on 29 August 1942.

National markings changes

Following the introduction of the Day Fighter Scheme and the Fighter Command special recognition markings, the next important change in the colour scheme of the Mosquito B.IV series (i)s came on 30 April 1942 when the Air Ministry wrote to all Operational Commands to inform them of the introduction of new type roundels and changes in the colour of the squadron and aircraft code letters. The changes which concerned the Mosquitoes were the introduction of what became known as National marking II of 32 inches diameter in place of the earlier 1-3-5 Red, White and Blue underwing roundels; National marking IIIs of 36 inches diameter in place of the earlier 1-3-5-7 Red, White, Blue and Yellow roundel on the fuselage and Tail fin marking (i) which was now 24 inches square and only had a 2 inch wide white stripe between 11 inch wide stripes of Red and Blue in place of the earlier equally proportioned rectangular marking. The 54 inch diameter Red and Blue roundels on the top of the mainplanes were not affected.

It is unclear how the changes in code letter colouring affected the Mosquitoes as the code letter colours depended on the colour scheme of the aircraft. Those in the Day Fighter Scheme were supposed to have Sky codes, but the rest of the RAF's bombers, both day and night were to change the colour of their codes from Medium Sea Grey to Red. Thus it might be possible that any Mosquito still finished in the Temperate Land Scheme with either Sky or Azure Blue under surfaces may have acquired Red codes for a time in early May 1942.

The end of May 1942 saw No 105 Squadron begin to fly its Mosquitoes on operations where the Fighter Command special recognition markings evidently proved to be more of a hindrance then a help, as on 7 July 1942, HQ Bomber Command signalled the Air Ministry to request permission to delete the Sky spinner, tailband and Yellow wing leading edge stripes. The Air Ministry gave permission for these markings to be removed on 11 July. The spinners were now to be painted Ocean Grey but the codes would remain in Sky. This was not quite the end of the matter as on 26 July the Air Ministry had to signal everyone to inform them that the Red, White and Blue National marking II roundels on the under surfaces of the wings of Mosquitoes were also being removed.

This revised scheme was included in AMO A.1096/42 which was issued on 8 October 1942, and which stated, "*Mosquito aircraft with a day role are to bear standard day fighter camouflage and colouring. National and tactical markings are to conform to the scheme for day bomber aircraft. The spinner is Ocean Grey. The code letters are Sky. No other recognition markings are carried*".

By this time however No 105 Sqn had relinquished its B.IV series (i) Mosquitoes in favour of the B.IV series (ii). AM

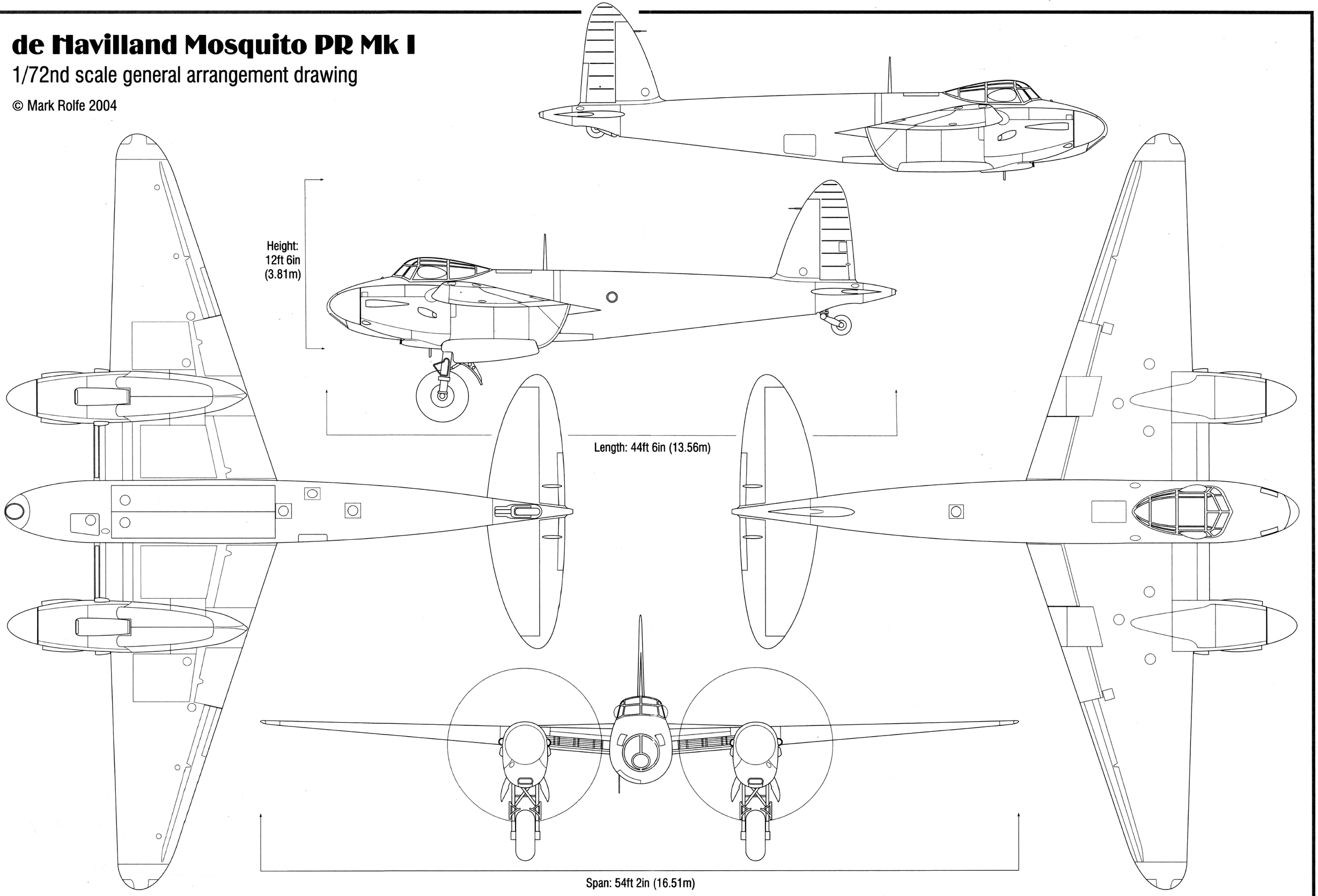
NB: Because the lack of hard photographic, documentary or physical evidence, all the colour artwork given here for Mosquito Bombers should be regarded as provisional and treated with caution until such time sufficient hard evidence becomes available to either confirm or refute the interpretations given here.

TOP Although DK291 was a Mosquito B Mk IV series (ii), it does show to advantage the Sky 'Fighter Command' tail band and Sky spinners applied to these early delivery Mosquitoes, (including the short-nacelled series (i) types), for a short time. in the spring of 1942

de Havilland Mosquito PR Mk I

1/72nd scale general arrangement drawing

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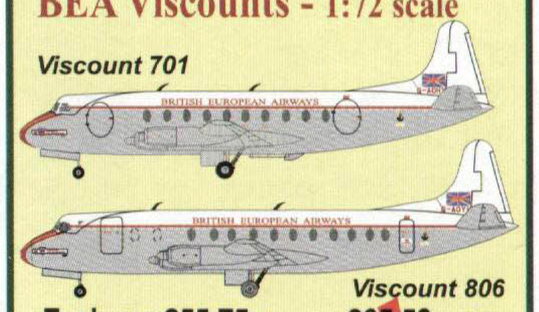
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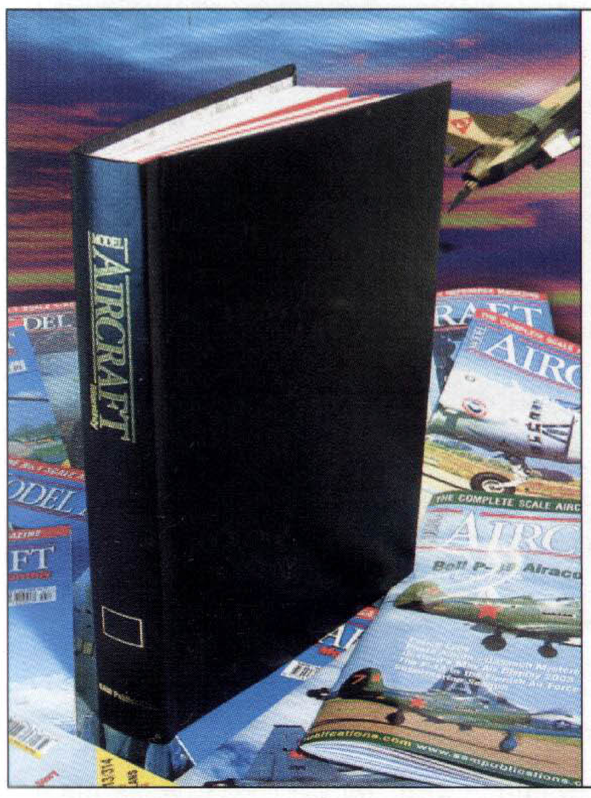
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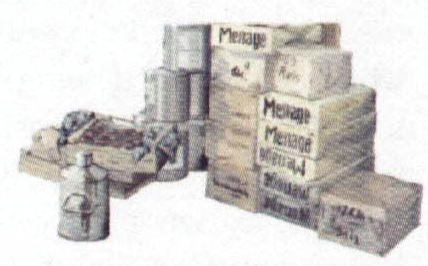
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First of the 'Wooden Wonders'

John McIllmurray builds one of the first photo recce Mosquitoes to enter RAF service, PR Mk I, W4051, in 1/72 scale using Model Aircraft Monthly's exclusive resin conversion set

WHEN THE MOSQUITO PROTOTYPE, W4050, fractured its fuselage in a tailwheel incident at Boscombe Down, the fuselage intended for the second prototype, W4051, was used to replace the damaged one.

Because of this, W4051 ended up receiving an early production fuselage, which resulted in it being the first Mosquito to taken on charge by the RAF, when it was handed over to No 1 PRU at Benson, Oxfordshire, on 13 July 1941, then commanded by Wg Cdr G W Tuttle OBE, DFC. Only nine more 'true' production PR Mk I Mosquitoes, with early style short engine nacelles and short span horizontal tailplanes, were produced, and all were delivered before the October was out, which not only makes this early photo recce 'Wooden Wonder', one of the lesser known Mosquitoes to model, but an equally fascinating and exclusive one too.

Modelling W4051 in 1/72 scale

There have been several 1/72 scale kits of the Mosquito produced to date, mainly of the 'solid-nosed' Fighter variant with the flat, fighter-style, bullet-proof, windscreen. However, what we need here is 'glass-nosed', split windscreen Bomber variant, and by the far the best option available is the Tamiya B Mk IV/PR Mk IV offering. (photo **1**)

The exclusive to 'Model Aircraft Monthly' readers **'Mosquito PR.I/B.IV series (i) Resin Conversion Set' (see page 50)** is actually designed to fit the Tamiya kit, and as will be seen is a relatively easy and straightforward modelling exercise which should be within the abilities of most modellers. (NB: Note the set does not include early style short wing tips seen only on the first Mosquito prototype). (photo **2**)

Wing Detail

The 'Model Aircraft Monthly' Rolls Royce Merlin 21 resin conversion engine nacelles, which with just a little trimming here and there, fit very well. (photo **3**) The only slightly adverse thing to say is that you may possibly have to file the tiniest sliver off the inboard edges of the kit's radiator parts to get them to fit.

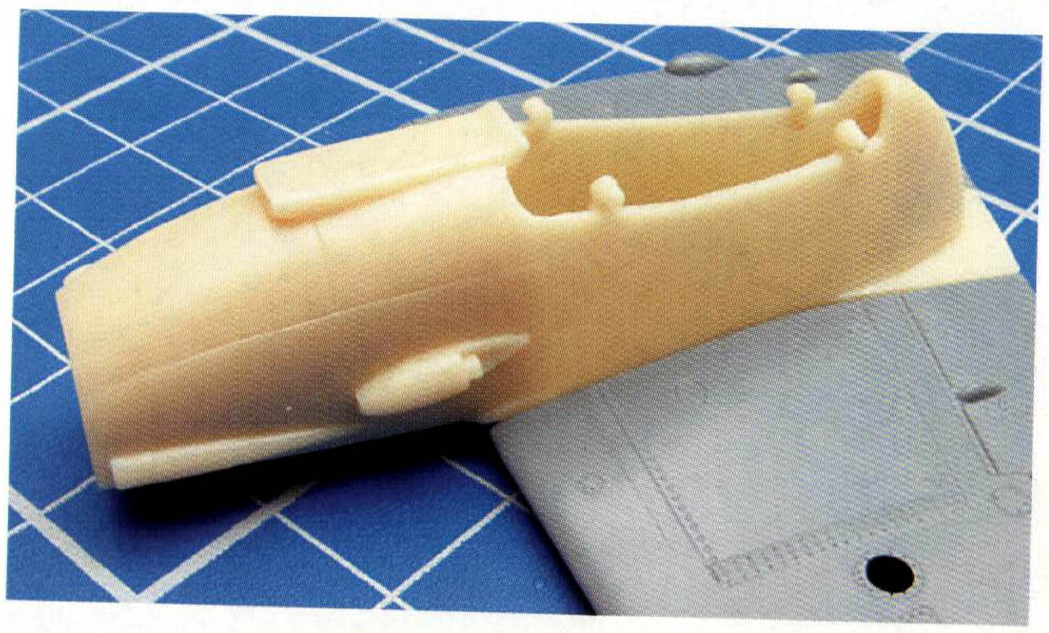
Photo **4** also shows how I have disagreed with the engraved hinge line of the rear nacelle/landing flap fairing. My new line is highlighted with black ink - but please check your own references as I may be mistaken! Note also how the landing



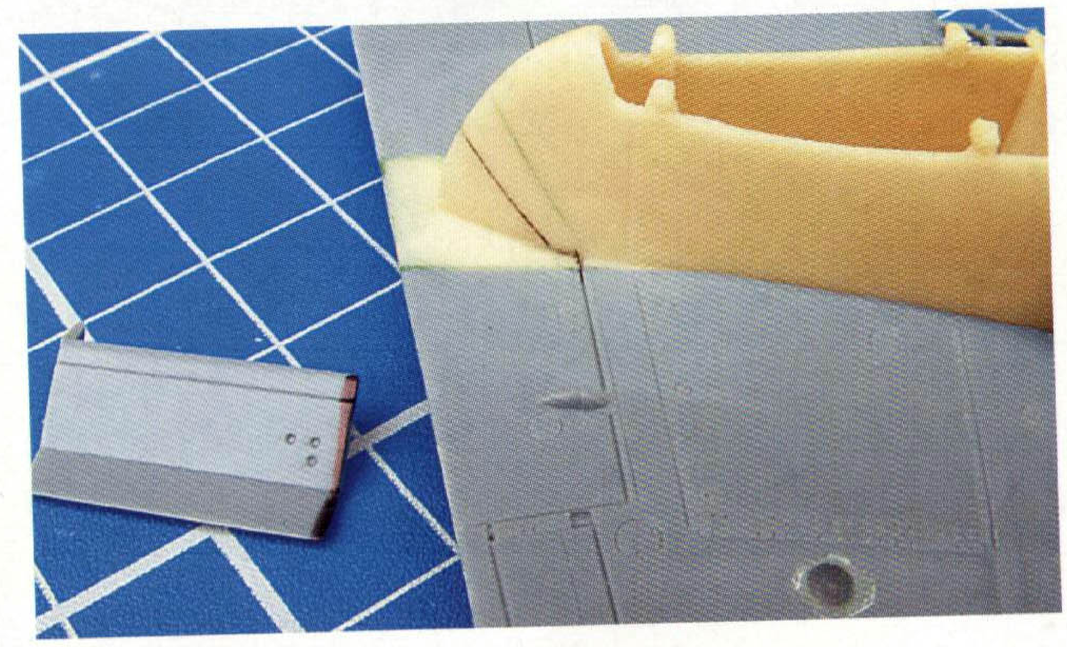
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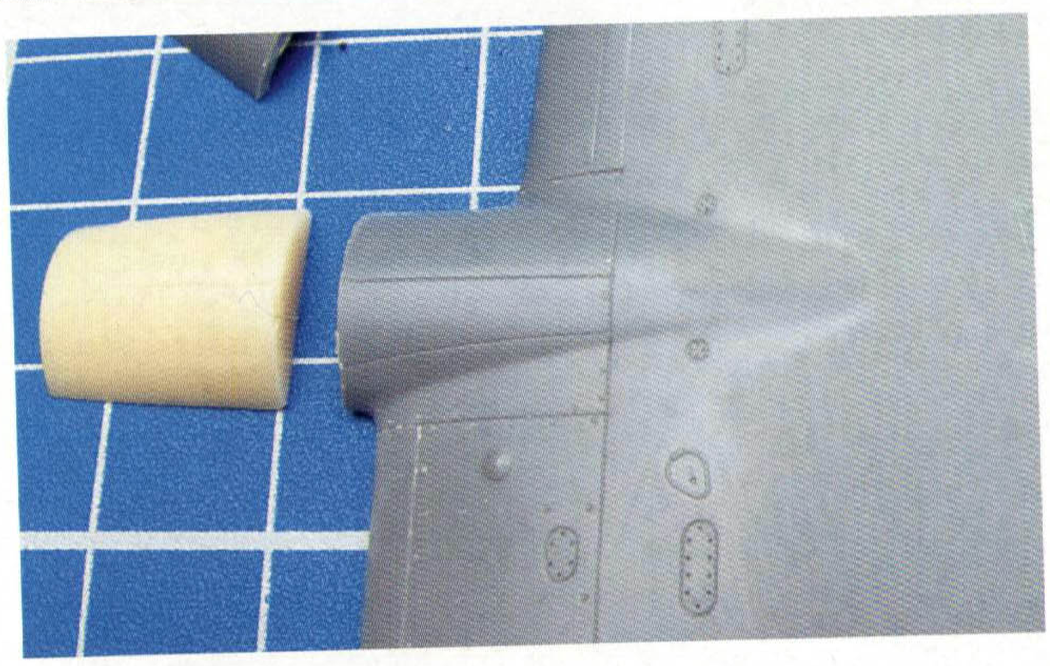
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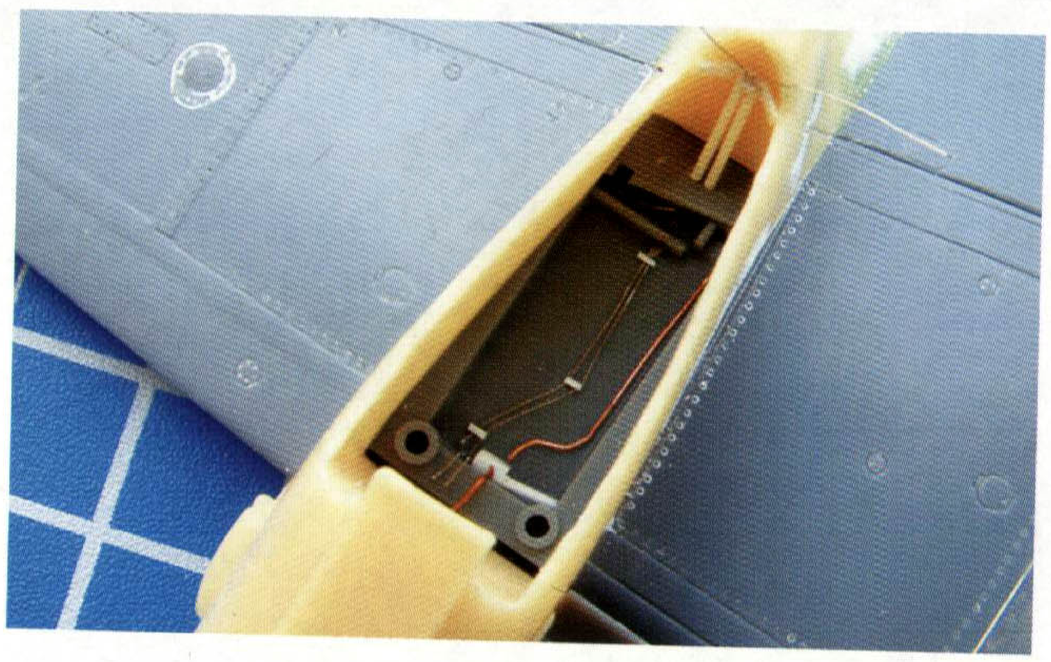
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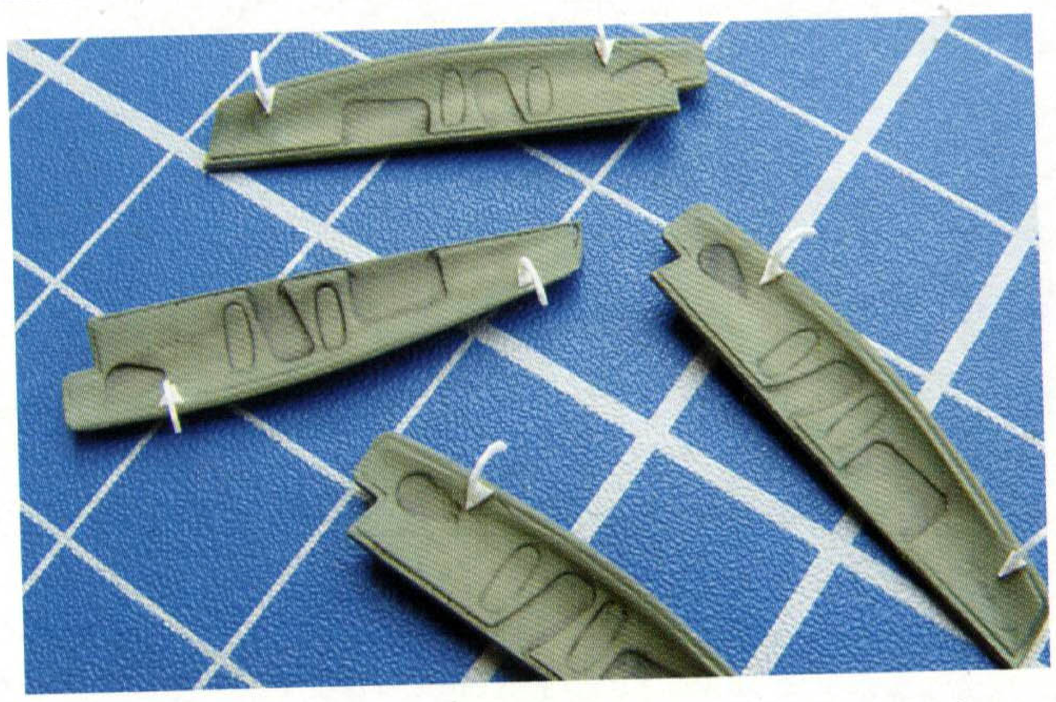
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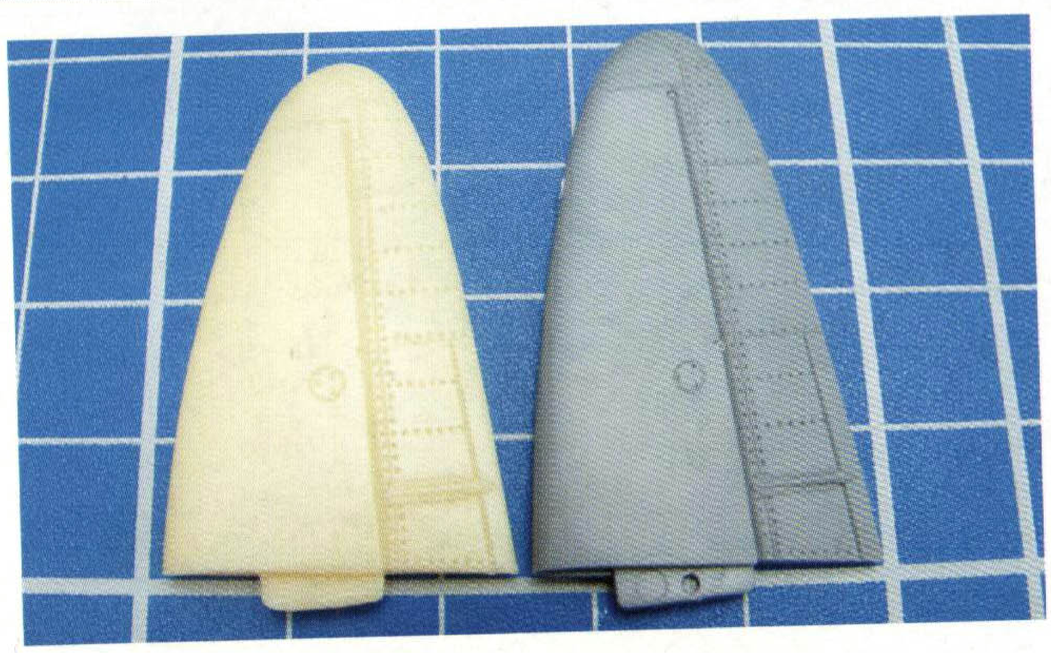
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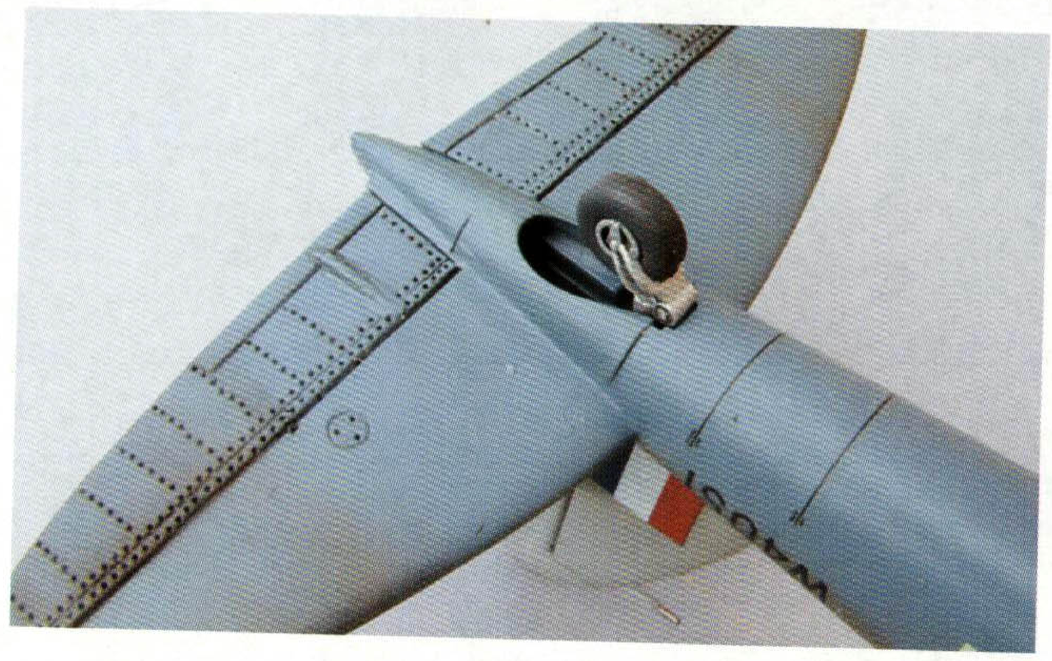
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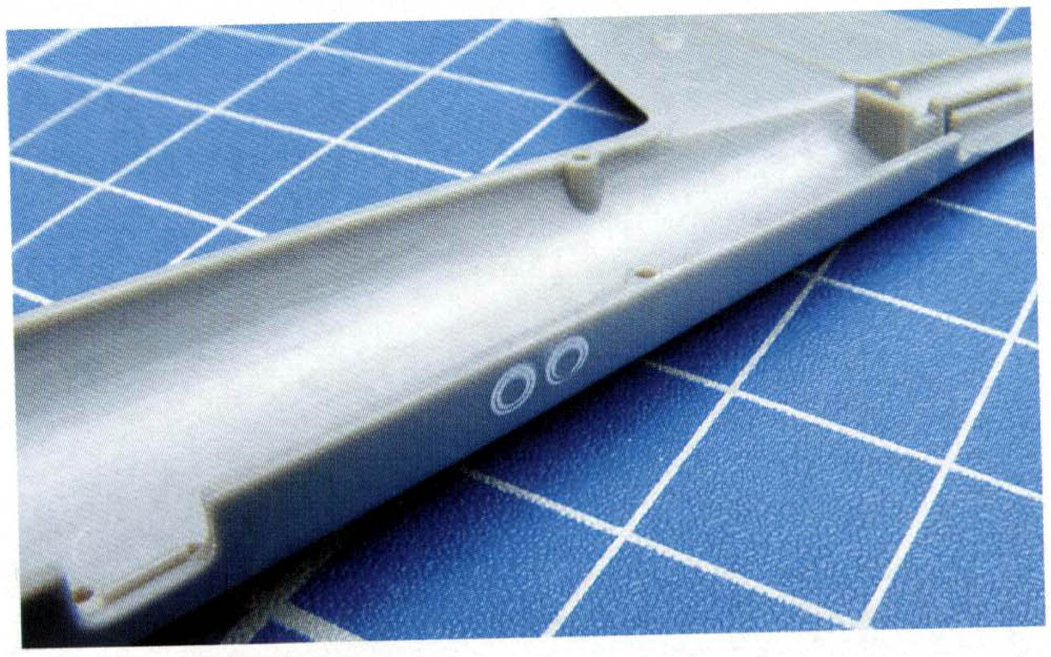


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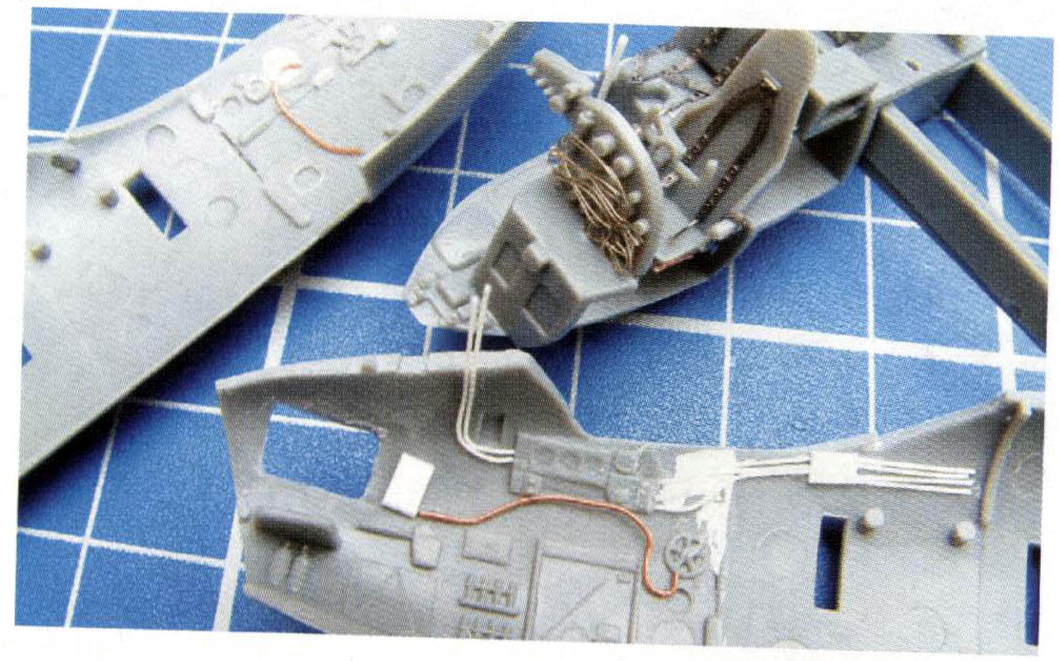


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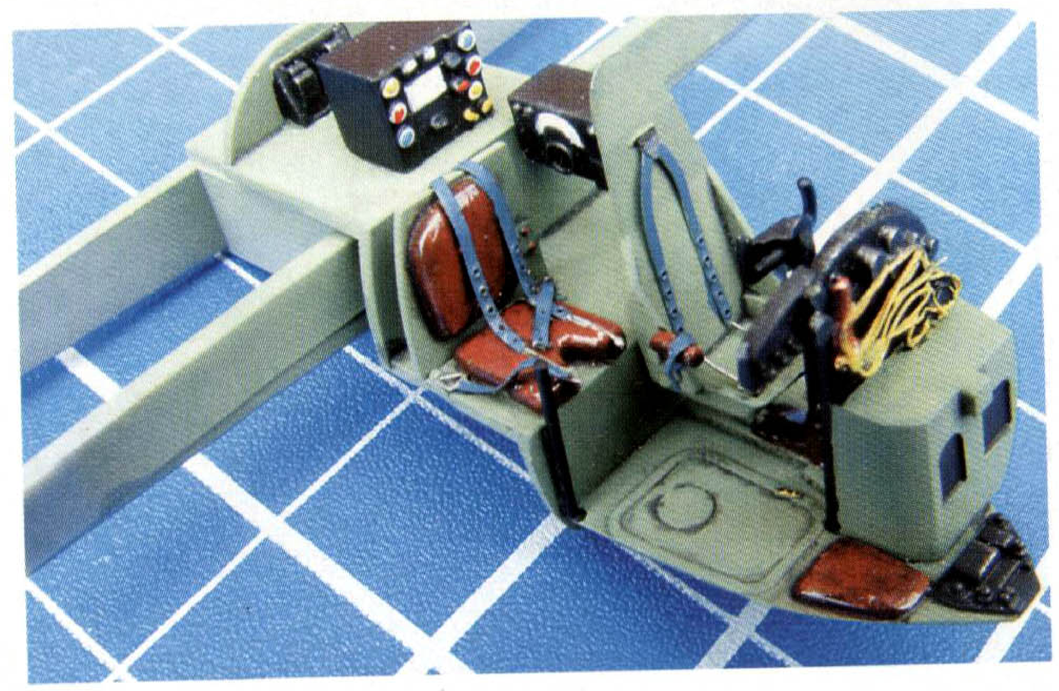
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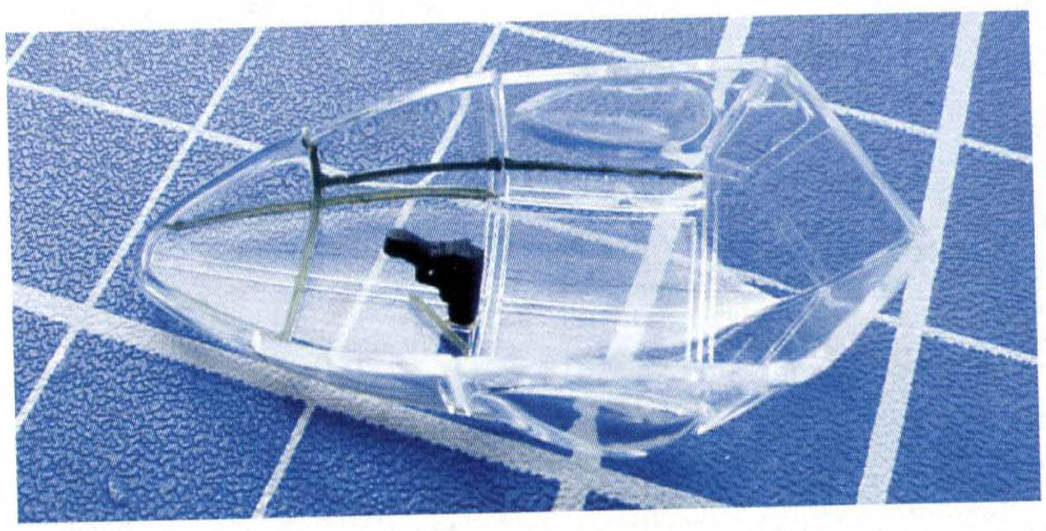
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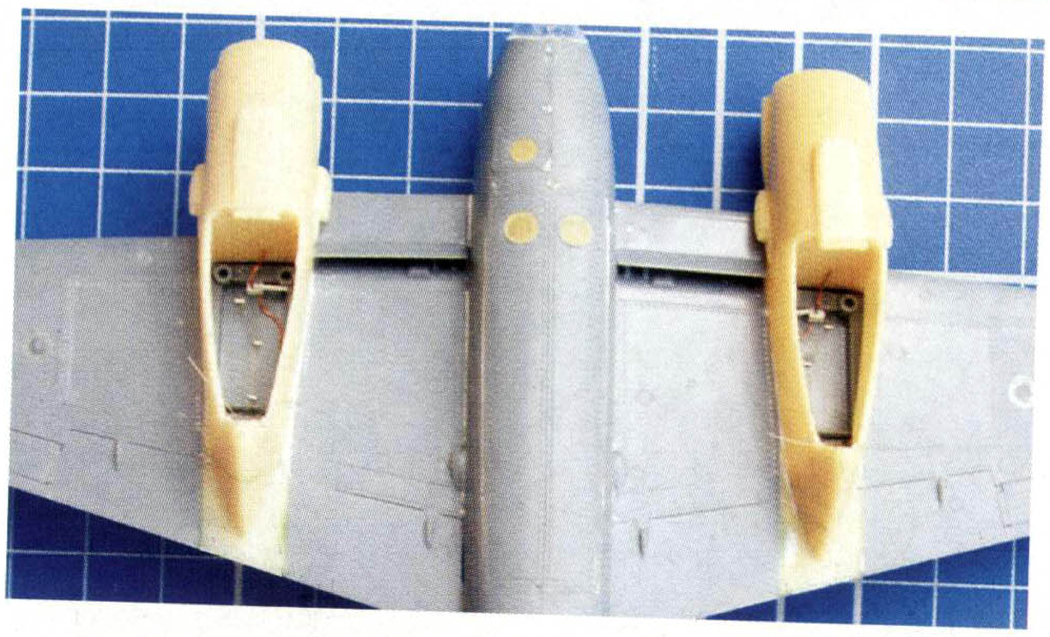
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16



17



18

light shows traces of filler and has been sanded flat. According to the Aero Detail title, (see references used later), these early PR Mk Is did not have the lights installed but did have the panel fitted ready for later models.

Photo **5** shows the upper wing work, which is a simple matter of removing the rear triangular nacelle fairing and upper engine cowl, followed by the filling-in of the flap mechanism inspection hatch



19



20

detail and the scribing across this area to make the landing flap look like one piece.

I am not too happy with modelling work on this area and if I made another PR I or B IV series (i) Mosquito, I would saw off what would become the one-piece flap entirely. This would help to sand the inner length of the flap as well as the wing edge, giving a much neater appearance!

Photos **6** and **7** show a bit of extra detail that I wanted to add. The detail in photo **6** is obviously best done before the new nacelles are added! Tamiya's representation of the Mosquito undercarriage (photo **7**) is just wonderful, there is also an advantage here in building a PR.I, in that these machines had the early style 'door guides' which Tamiya represent. Extra work on these already superb items, includes brake piping, brake pipe reservoir, (directly below the oil tank), cross member bracing for forward gear door cables and rollers for the same on the forward edges of the oleo struts, and finally some extra 'V-shaped' bracing behind the tyres and of course the holes drilled into the mud guard top stiffeners. The Tamiya kit has very few bad points but one that has to be mentioned is the gear door hinges, (photo **8**), which shows them replaced with plastic sheet.

With the upper and lower wing work preparation complete, the two wing halves were cemented together. When dry, the replacement upper engine cowl tops were added, needing just a little trimming and filler in the process.

Fuselage and Tail

These early Mosquito PR Mk Is had a slightly shorter tailplane span. The difference in the resin and the kit parts is noticeable. (photo **9**) They do not fit quite as well as the Tamiya kit parts but a little filler soon blended them in. Another feature of these early Mosquitoes was the standard 'smooth' tyre tailwheel without the 'anti-shimmy' tyre walls feature, which is included in the resin conversion kit. (photo **10**)

The final detail to be mentioned that directly relates to the first ten PR Mk Is is the lack of identification lights under the rear fuselage. (photo **11**)

Cockpit and Canopy

Photos **12** and **13** illustrate some of the extra detail I carried out on the cockpit and canopy. I was reluctant to go any further than what I did do as you cannot see much of the extra work through the kit's injection moulded canopy! Besides which, the kit detail is lovely as it is. What may not be clear, (in photo **12**), however is the removal of the side ledges inside the nose side window apertures. These prevent the kit windows being pushed too deep inside the nose but do not lend themselves at all well to looking accurate in this scale and so they were removed.

It may also not be that obvious but the R.1155 radio receiver, (located behind the pilot's seat), has been repositioned lower down than recommended by the kit instructions. This has the advantage of not needing the rear of the set to be blanked off, (it being moulded 'open' to prevent sink holes in the detail). Photo **14** shows the finished result.

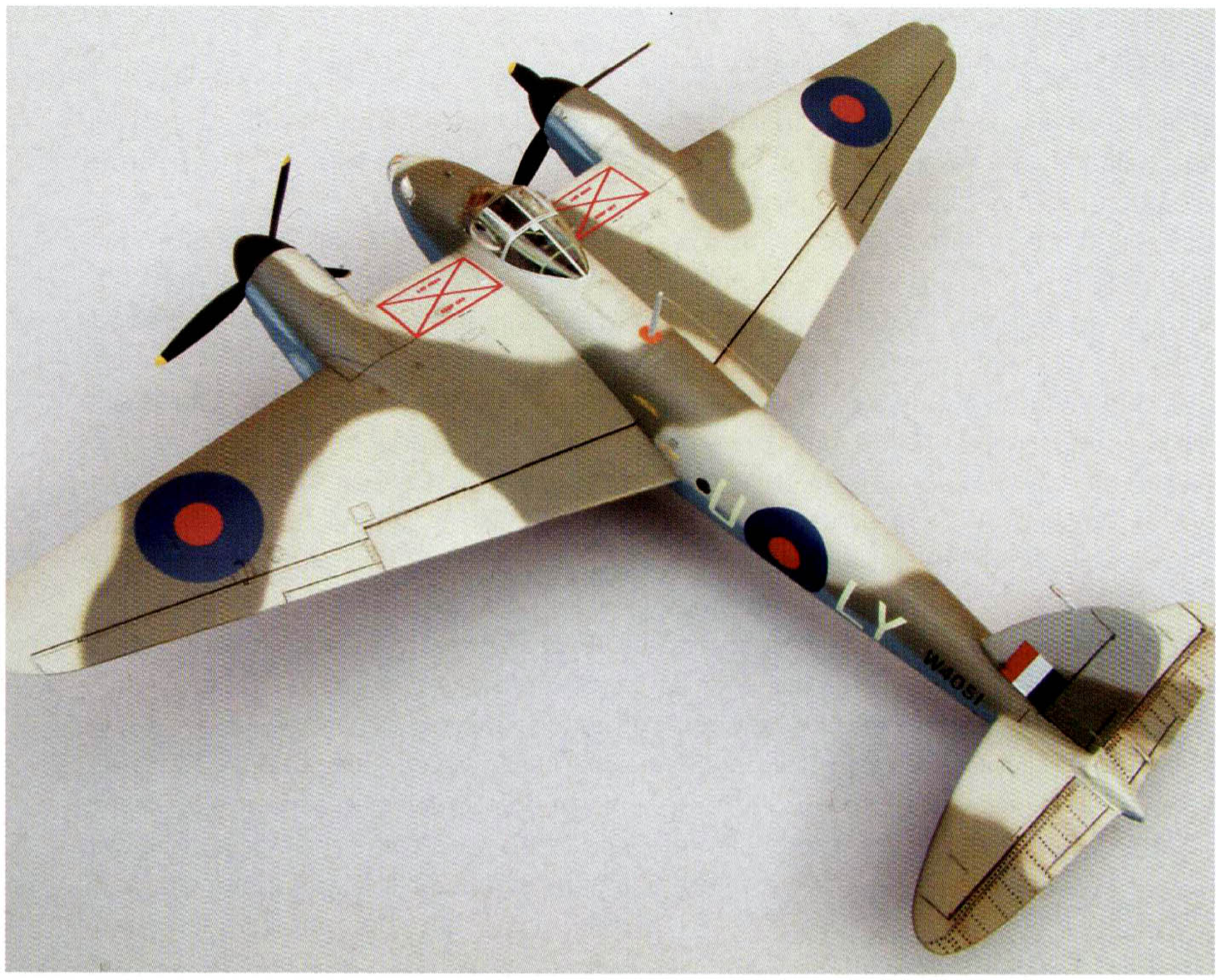
Photo **15** shows an aspect of Mosquito modelling that must be remembered - its internal canopy framing. Tamiya kindly provide decals for the internal framing that is visible from the outside. The decals however were a different colour of 'cockpit green' to the PolyScale acrylic paint that I use, so I painted them on by hand, although I would normally use decal strip for this. Like Tamiya, I also forgot to apply internal framing to the front section between the end of the escape hatch side framing and the beginning of the windscreen! However, this was applied after the under construction photo was taken and can be seen later in the photo showing the external decal strip framing. I fitted a signal flare gun, but unfortunately, upon reflection, this flare gun should perhaps have been a little smaller.

Painting and Decaling

With the exception of the nose side windows, which were a very tight fit and needed trimming, everything went together well, with very little filler needed. It was then a case of getting everything ready for spraying. I applied some Tamiya masking tape to some very thin sheet plastic and proceeded to punch out two different diameter holes with my Waldon Punch and Die set for my PR.I's various portholes. The Tamiya tape was then peeled off the punched-out circles and applied to the kit's various camera windows as well as the entry hatch window. (photos **16** and **17**)

With all the clear parts masked off the entire model was primed using Halfords Acrylic Auto Primer. Photo **18** shows the aircraft in the experimental AFDU/RAE scheme of Olive Grey and Medium Sea Grey upper surfaces with the PRU Blue under surfaces following the in-service repaint by No 1 Photographic Reconnaissance Unit based at Benson. Hannant's Xtracolor enamels were used throughout, with the Olive Grey being my own mix of Extra Dark Sea Grey and US Olive Drab, to match the various references' descriptions of the colour. In hindsight, my mix looks just a shade greyer than RAF Dark Green but I can live with that!

With the paint dry, it was time to apply the decals and it is here that the only real headache of the entire project was met with - where to find 42 inch diameter Red and Blue National marking I fuselage roundels!?! Later on, the diameter would change to 36 inch diameter, which are supplied by Tamiya, but the fuselage

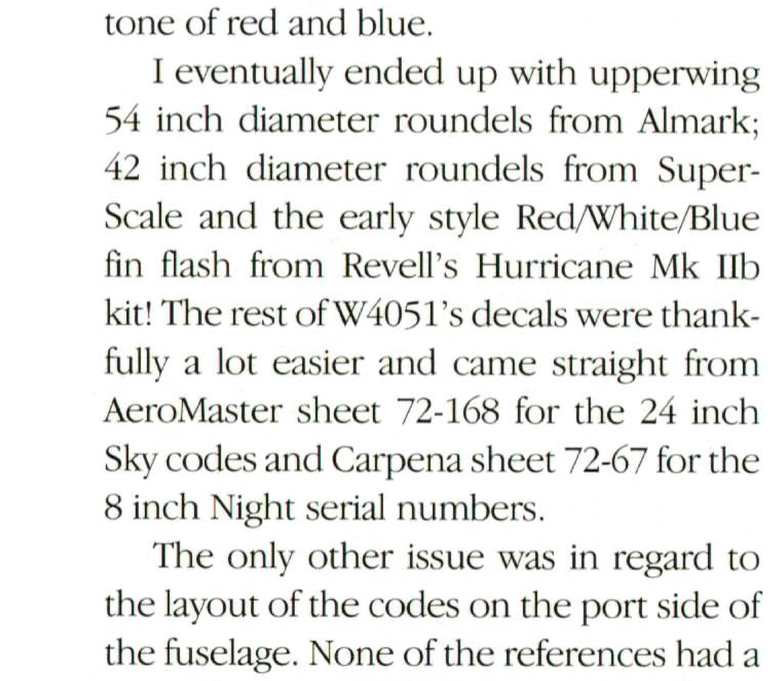


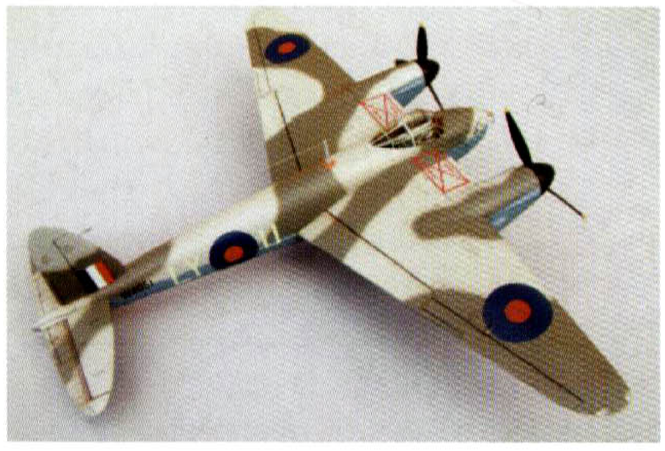
roundels on W4051 retained the diameter of the original Red/White/Blue/Yellow roundels!

I eventually found some, albeit in the form of a mistake by SuperScale whose 'Hawker Hurricane Aces' sheet, (72-294), had upperwing Red/Blue roundels that were too small to be the correct 49 inches. Having found the fuselage roundels it was then a case of trying to find upperwing roundels and fin flashes with the same tone of red and blue.

I eventually ended up with upperwing 54 inch diameter roundels from Almark; 42 inch diameter roundels from SuperScale and the early style Red/White/Blue fin flash from Revell's Hurricane Mk IIb kit! The rest of W4051's decals were thankfully a lot easier and came straight from AeroMaster sheet 72-168 for the 24 inch Sky codes and Carpena sheet 72-67 for the 8 inch Night serial numbers.

The only other issue was in regard to the layout of the codes on the port side of the fuselage. None of the references had a port side view of W4051 in service with No 1 PRU. Some references' artwork shows





the port fuselage codes reading the 'standard' way, ie LY•U. Other references' artwork, has the port side codes reading U•LY, and I concluded that this layout should apply to W4051, if for no other reason than due to the large size of the fuselage roundel! Although this was the interpretation that I went for - I must hasten to add that it was without seeing a photo of the actual W4051 whilst serving with No 1 PRU at Benson, and therefore it is only my own conclusion and interpretation!

Once all the various decals, including the Tamiya kit stencilling, were firmly bedded down, the model was given a number of light coats of Xtracolor Matt Varnish and left 'to cure' for a week.

Photo **19** shows the last of the decal work, the canopy framing. This is my favourite way of creating canopy framing; it just takes a little patience and time.

Finish

I wanted a fairly new looking Mossie to give the impression that this historic aircraft had only recently been taken on charge by the RAF. Weathering therefore, was limited to the few inspection hatches that exist on the Mossie and some mild exhaust staining on the nacelles and horizontal tailplane. (photo **20**)

Conclusion

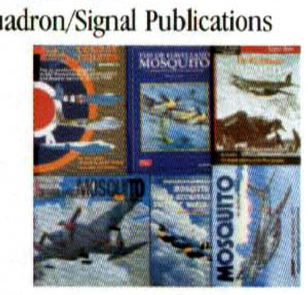
It is a real delight to have in my collection such an historic subject and this 'Model Aircraft Monthly' resin conversion set should appeal to all those interested in World War Two history and photo-reconnaissance aircraft in general, and Mosquitoes in particular. Due to the relatively simple nature of the conversion, which requires hardly any surgery, this set is a great 'first', for those who have never done conversion modelling before - therefore I am happy to recommend this set to a great proportion of 1/72 scale modellers. My thanks to 'Model Aircraft Monthly' for enabling me to model a subject I have wanted to do for a long time.

Below are just some of the excellent references available for Mosquito modelling. Admittedly the Aero Detail publication is a little hard to get hold of but well worth the search. It was this title that I sided with regarding what equipment these early PR Mk Is carried or didn't carry, (there being a number of differences in camera layout between the various titles).

Happy modelling. AM

Other references used:

- 'The De Havilland Mosquito' Modellers Datafile No 1, SAM Publications
- 'Mosquito Photo-Reconnaissance Units of World War 2' Combat Aircraft No 13, Osprey Publications
- 'Mosquito in Action: Part 1' Squadron/Signal Publications
- 'De Havilland Mosquito: An Illustrated History' Crecy Illustrated
- 'Mosquito PR and Bombers in RAF service 1941 to 1945' Combat Colours No 5, Guideline Publications Ltd



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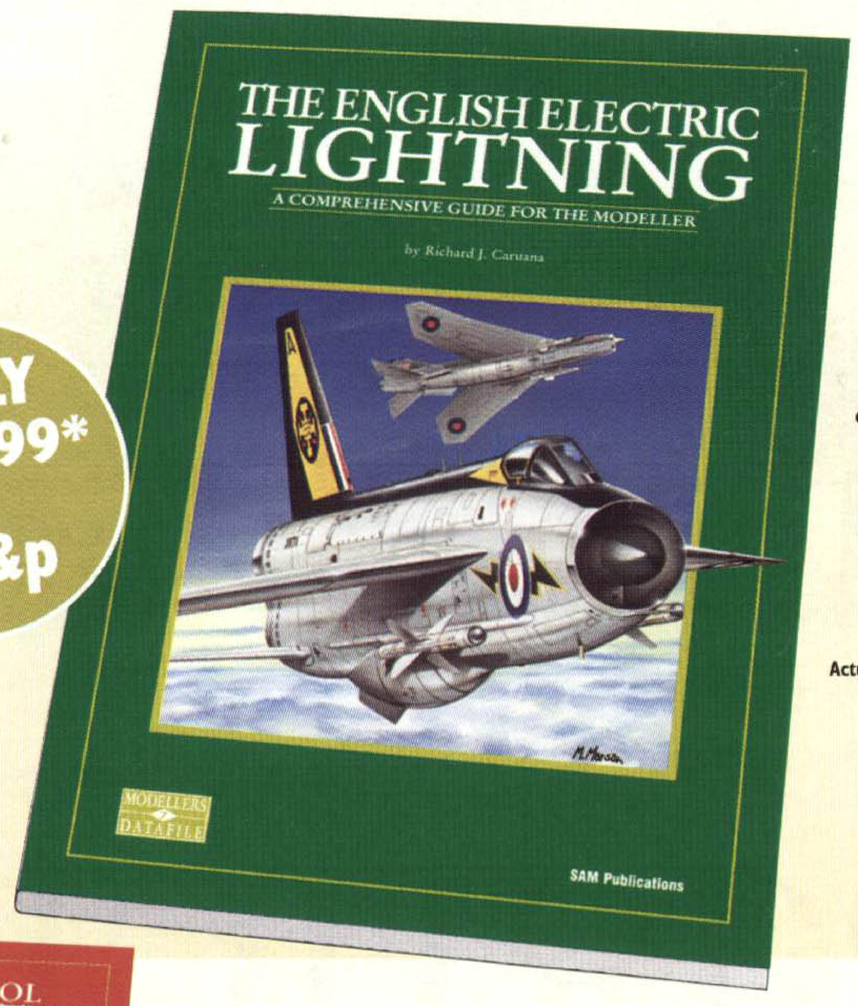
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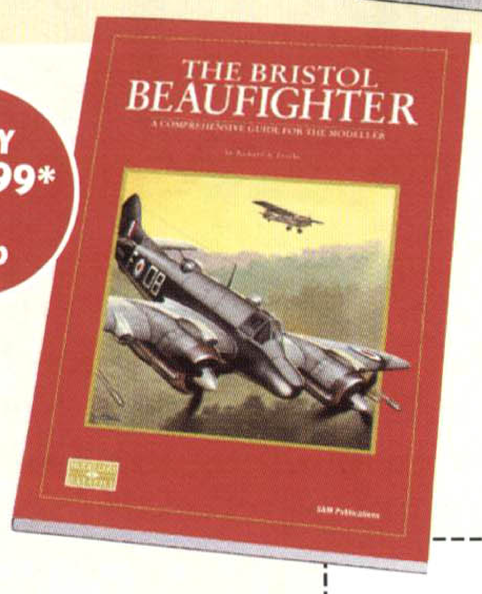
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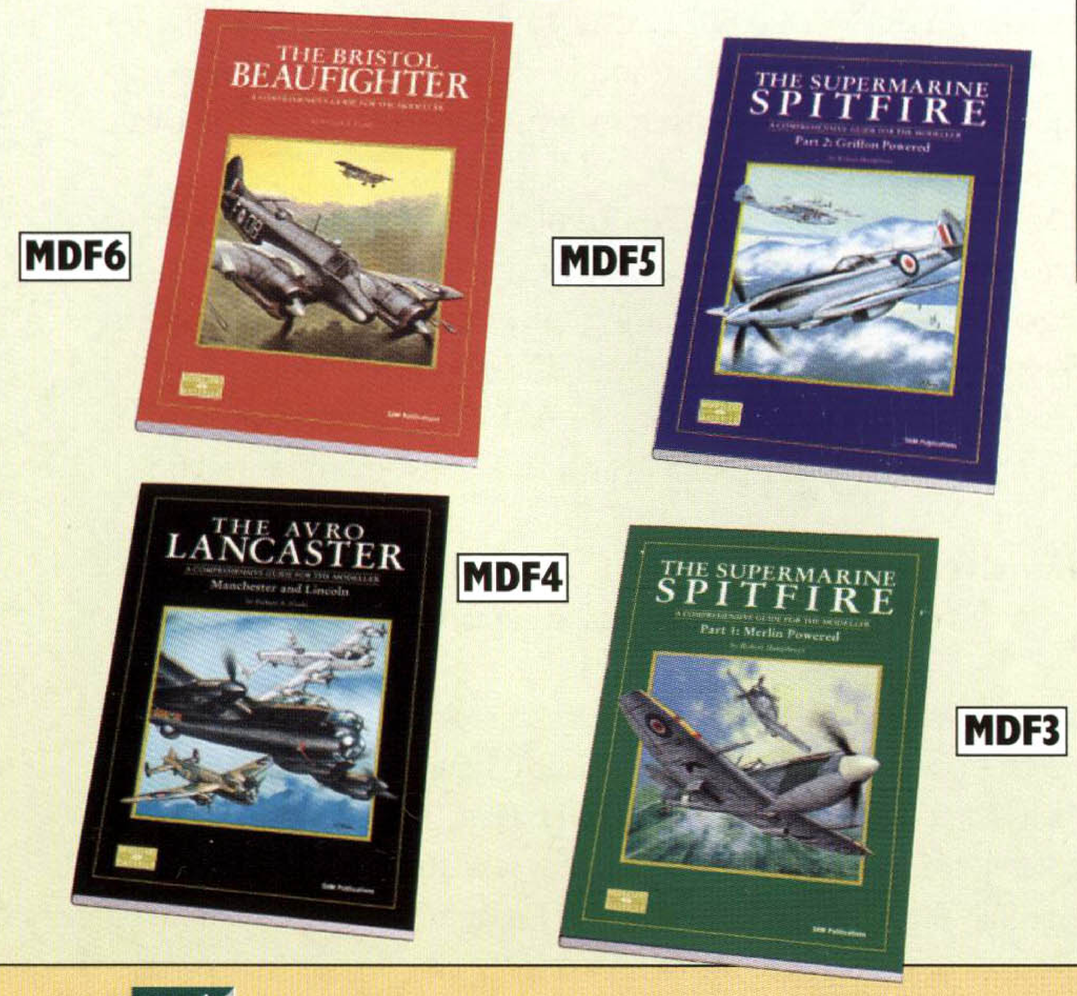
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MAM–04–04



Daguet Jaguar

Despite their relatively small number, the Jaguar As still provided the lion's share of the Armée de l'Air operated types deployed as part of 'Operation Daguet', and proved to be very effective part of Desert Storm as MAM's new editor, Neil Robinson, describes...
...and then keeps his modelling hand 'in' by building the Airfix/Heller 1/48 scale Jaguar A kit in 'Operation Daguet' markings

NEVER MORE THAN TWENTY-EIGHT OR SO STRONG at any one time, the Jaguar As of 11e Escadre de Chasse's four Escadrons were frequently rotated through their home bases at Toul-Rosières and Bordeaux-Merignac to Al Ahsa Air Base in Saudi Arabia, and flew over 600 operational sorties during the conflict.

11e Escadre de Chasse was placed on standby on 16 September 1990, but it was not until 18 October that its first eight aircraft were despatched to the area under the command of Colonel Marc Amberg. These were followed by a further eight on the 21st. Their destination the remote air base of Al Ahsa in Saudi Arabia, some 80 miles to the south west of Dhahran.

A further twelve Jaguar As arrived in early January, the aircraft now representing all three of the Toul-Rosières based units, ie Escadron de Chasse 1/11 'Roussillon', EC 2/11 'Vosges' and EC 3/11 'Corse', plus elements of EC 4/11 'Jura' from Bordeaux-Merignac. The new arrivals also included pilots from 7e Escadre de Chasse based at St Dizier.

Self-defence suite

Lacking the more sophisticated equipment such as the FIN 1064 and LRMTS fitted to the RAF's Jaguar GR.1s, for self-defence the French Jaguar As used varied combinations of underwing stores - depending upon operational role. The port outer wing pylon was invariably fitted with either the Thomson-CSF 'Barracuda' or ESD CME Dassault Electronique 'Barax' detector/jammer ECM pods, or the 'Remora' wide band ECM detector/jammer pod. This was 'balanced' with either a Philips-Matra Phimat or Bofors BOZ-103 chaff/flare pod, or Matra R550 Magic 2 air-to-air missile on the starboard outer wing pylon.

Also fitted to many Jaguar As was the French designed 56 cartridge, ALKAN 5020/5021 conformal chaff/flare dispenser fitted beneath each wing root and occasionally the fourteen cartridge La Croix flare dispenser, mounted in the tail cone in place of the drag-chute.

Most of the EC 11 Jaguars deployed to Al Ahsa appear to have been fitted with the Thomson-CSF CILAS TAV-38 laser range-finder mounted in a fairing under the extreme nose, with a few sporting the smaller Omera 40 panoramic camera fairing. The self-defence suite was completed by the aircraft's own internal Thomson-CSF TH Radar Warning Receiver on the tail fin.

Offensive armament

On the offensive side of things, weaponry included the excel-

TOP Jaguar A, A153, 11-RA of EC 3/11 'Corse', photographed back at its home base of Toul-Rosières. Note the Matra R550 Magic 2 air-to-air missile on the starboard outer wing pylon and the starboard engine panel in the standard European grey/green camouflage scheme. (Del Bianco via Andy Evans)
OPPOSITE TOP Another Gulf War veteran Armée de l'Air Jaguar A photographed safely back at its home base, A135, 11-RJ of EC 3/11 'Corse'. Note the heavy oil stains along the starboard engine panel. (Del Bianco via Andy Evans) MIDDLE Armée de l'Air Jaguar A, A87 of EC 3/11 'Corse', on its way to a target "somewhere in Iraq", armed with a pair of 250kg SAMP 25 free-fall bombs under each inboard pylon. (via Andy Evans) BOTTOM Armée de l'Air Jaguar A, A100, 11-ER of EC 1/11 'Roussillon', photographed outside an HAS, and armed with the very effective AS 30L laser-guided, air-to-ground missile. (via Andy Evans)



lent Thomson-CSF ATLIS II, (Automatic Tracking Laser Illumination System), laser designator pod mounted on the fuselage centerline station, providing a self-contained precision weapon delivery system - this being used most notably, and very successfully, with the Aerospatiale AS 30L laser-guided, air-to-ground missile, which was normally carried under the starboard inner wing pylon, invariably 'balanced' under the starboard inner wing pylon wih a 1200 litre drop tank, or, towards the final phase of the war, a pair of the indigenous 480kg BLG 450 Laser Guided Bombs - one each under the inner wing pylons.

A pair of Matra/Thomson Brandt BLG-66 'Belouga' 290kg parachute retarded 66mm sub-munitions dispenser cluster 'bombs', (similar to the RAF's BL 755), or 250kg SAMP 25 free-fall bombs - mounted on twin side-by-side carriers - could be carried under the inboard pylons, usually with a 1200 litre drop tank under fuselage centreline.

Other 'offensive' items of kit employed on occasions were the centreline-mounted Thomson Brandt BAP 100 anti-runway bombs; the Jaguar being capable of carrying two clusters of nine weapons (eighteen in all) in a 14-3-M2 launcher and the Thomson Brandt BAP 120 anti-armour bombs, similar in employment to the BAP 100. On occasions, LR-F1 non-reloading launcher pods containing 68mm rockets were also carried on the inner wing pylons.

Several photo reconnaissance sorties were undertaken by the Jaguars for which the centerline station was used to carry an RP 36 P photo reconnaissance pod, and for EW support, the Thomson-CSF Caiman or Basilisk pods were also carried. Although French Jaguars lacked the ability to carry the overwing AIM-9 Sidewinder missiles/launchers, they still had the benefit of their internal DEFA 553 30mm cannon, with 300 rounds of ammunition, which proved ideal for strafing.





Jaguar operations

Assigned to daylight only operations and constrained somewhat by the weather, the Armée de l'Air Jaguar A's first mission took place on 17 January 1991 - Day 1 of the war. Twelve aircraft attacked a Scud missile facility at the Ahmed Al Jaber Air Base, laying down their 'Belouga' cluster bombs from a height of just 100 feet, and launching a number of AS 30L missiles. The aircraft encountered murderous AAA which resulted in damage to four of their number - one taking a direct hit in the starboard engine and severe damage to another which was hit adjacent to the port engine exhaust by a shoulder launched SA-7 'Grail' SAM



missile, which set fire to the engine. Thankfully, the pilot was able to retain control of the aircraft and made an emergency landing. The rear of the aircraft was badly holed and it was crated-up and returned to France.

Having learned the same hard lesson as the RAF about low-level operations, a further twelve Jaguars in three groups of four, raided a munitions dump at Ras Al Quilayah on Kuwait's coast, some 30km from Kuwait City during the morning of 18 January, this time flying at medium level. Operating without 'top cover' and profiting from the earlier destruction of the Iraqi radars and SAM tracking systems, four laser-guided AS 30L air-to-ground missiles were released against storage hangers in a dive from 4,000ft and at a stand-off range of 10km. Meanwhile, the other eight Jaguars dropped 250kg bombs onto their targets from 15,000ft. The Ras Al Quilayah site was reportedly housing MM-39 Exocet sea-skimming missiles captured from the Kuwaiti Navy during the August invasion.

The same facility was attacked again on the 19th and was due for more 'attention' on the 20th, but this mission was called back due to severe thunderstorms in the area. The weather again grounded the Jaguars on the 21st, however, on the following day, six aircraft launched their AS 30Ls against Iraqi vessels, and on the 23rd eight more hit artillery positions with 250kg bombs. With the switch to a higher operating altitude, the efficiency of the 'Belouga' system was seriously degraded as it was principally a low-level weapon and thereafter saw limited use. Some accounts also indicate that Armée de l'Air Jaguars launched a number of Matra R-3 100mm unguided rockets and were also seen to be carrying a centerline RP 36P reconnaissance pod for a small number of in-house missions; however, the bulk of the information gathering was left to the specialised Mirage F.1CRs.

With the resignation of the French Defence Minister Chevènement after his pro-Iraqi stance was overruled by Prime Minister Mitterand, his successor Pierre Joxe took a more positive line and allowed strike missions to be flown into Iraq, stepping up the momentum of operations to two missions per day, the first of which took place on 24 January when attacks were made against mechanised units of the elite Republican Guard and their entrenched gun emplacements. This change of direction also led to the lifting of the grounding embargo imposed on the French Mirage F.1CRs and they began flying as 'shotgun' to the Jaguar raids. The first such combined operation took place on the 26th when two Mirage F.1CRs used their onboard Cyrano IVMR radar and Uliss-47 Inertial Navigation System to provide a strike package of six Jaguars with accurate navigational data for a raid on a Divisional Command Post and artillery positions in southern Kuwait. The Jaguars subsequently began attack sorties against sites at Tallil, Shaiba and Jalibah.

By the end of the war the Jaguars had flown 615 sorties, using up 1,088 flying hours and were ably supported by their Boeing C-135FR tankers from 93e Escadre from Riyadh, with whom they made 185 'contacts'.

Jaguar Camouflage...

At least six variations on a general desert camouflage scheme were recorded on Armée de l'Air Jaguars during the Gulf War! An original dark brown and light sand two-tone upper surface scheme and a four-tone dark brown, medium brown, tan and light sand upper surface scheme, (known as the Chad Schemes) - both of which featured matt silver under surfaces - had been applied for deployments and previous operations in Chad, and appear to have predominated especially during the initial stages of 'Desert Sword/Desert Storm'.

However, at least four other two-tone schemes, again which featured matt silver under surfaces, were documented and even given names, (see accompanying list).

As the conflict progressed, most of the Jaguars were rotated back to Metropolitan France for routine and/or major servicing, and many re-emerged in these new lighter/lower contrast two-tone tan/beige and sand/cream upper surface schemes, (possi-



TOP A108, 11-MP of EC 2/11 'Vosges', at Toulon in 1991 after being repainted in the Beige and Light Stone,'Creme Sable' Arabia Type A2 scheme. (Tim Darrah) **ABOVE** A104, 11-EK of EC 1/11 'Roussillon', setting off from Al Ahsa armed with what appear to be small bombs on TER under the inboard pylon. Note the 'Barax' ECM pod on the port outer wing pylon. (Tim Darrah) **OPPOSITE TOP** A127, 11-EH of EC 1/11 'Roussillon', awaiting servicing and repainting at Toulon in the original contrasting Chocolat and Creme 'Chad Scheme'. (Tim Darrah) **BOTTOM** A107, 11-MV of EC 211 'Corse', returning to Al Ahsa from a sortie over Iraq. Note the Thomson-CSF TAV-38 laser rangefinder under the nose and Matra R550 Magic 2 air-to-air missile on the starboard outer wing pylon. (Tim Darrah)



bly the ones known as Arabia Type A2 'Creme Sable' and Arabia Type B1 'Sable Rose'). Several aircraft also had their individual aircraft letters changed and some were even reallocated to a different Escadron.

...and Markings

Standard Jaguar diameter Armée de l'Air cocardes, without any yellow outline, were retained above and below both mainplanes and on either side of the rear fuselage. The aircraft's construction number, (a one, two or three digit number prefixed by the letter A), appeared on either side of the rudder and on the nosewheel door. The aircraft's individual i/d letter was also repeated on the nosewheel door, above the construction number.

The tactical codes were made up of four characters. The Escadre numeral, (ie 11 for 11e Escadre), a hyphen, then the Escadron letter, (E for EC 1/11, M for EC 2/11, R for EC 3/11 and Y for EC 4/11), and finally the aircraft's individual i/d letter. They were applied on either the engine intakes, immediately behind the blow-in doors under the wing leading edge, or, presumably so as not to be covered by the ALKAN 5020/5021 conformal chaff/flare dispenser, on the forward fuselage just below the cockpit canopy. Presentation of these codes also varied with the Escadre numeral in either solid black or outline only in a stencil style. The Escadron and individual i/d letters were invariably in solid black but often in a stencil style.

The traditional SPA (historic unit) badges appeared, one each, on either side of the fin below the ILS aerials and comprised 'masque tragique' and 'masque de comédie' for EC 1/11; SPA 91's skull carrying eagle and SPA 97's pennant for EC 2/11; SPA 88's and SPA 69's pennants for EC 3/11; and SPA 158's 'serpentaire' and SPA 161's 'sphinx' for EC 4/11.

One aircraft, A103 11-MA of EC 2/11, was also pictured wearing fourteen 'bomb silhouette' mission symbols on the forward fuselage but how widespread this practice was is unknown at the time of writing. As the Jaguars were worked hard, their colour schemes began to reflect the situation, with heavy exhaust staining, touched up panels, and bleached paintwork. AM

Operation 'Daguet' Jaguar Camouflage Scheme variations

Chad Scheme - (two-tone variation)
Upper Surface: Creme FS 33798 and Chocolate FS 30125
Lower Surface Aluminium FS 17178

Chad Scheme - (four-tone variation)
Upper Surface: Chocolate FS 30125, Dark Tan FS 30215, Light Stone FS 33531 and Creme FS 33798
Lower Surface: Aluminium FS 17178
Examples: A149/11-RK

Arabia Type A1 'Melanges'
Upper Surface: Dark Tan FS 30215 and Creme FS 33798
Lower Surface: Aluminium FS 17178
Examples: A94/11-ES, A137/11-EJ and A139/11EV

Arabia Type A2 'Creme Sable'
Upper Surface: Beige FS 33617 and Light Stone FS 33531
Lower Surface: Aluminium FS 17178

Arabia Type B1 'Sable Rose'
Upper Surface: Light Sand Pink FS 33613 and Desert Pink FS 32648
Lower Surface: Aluminium FS 17178
Examples: A148/11-YD, A112/11-MO and A135/11-RJ

Arabia Type B2 'Sable/Creme Celomer'
Upper Surface: Creme FS 33798 and Dark Tan FS 30140
Lower Surface: Aluminium FS 17178

Examples of 11e Escadre de Chasse Jaguar As

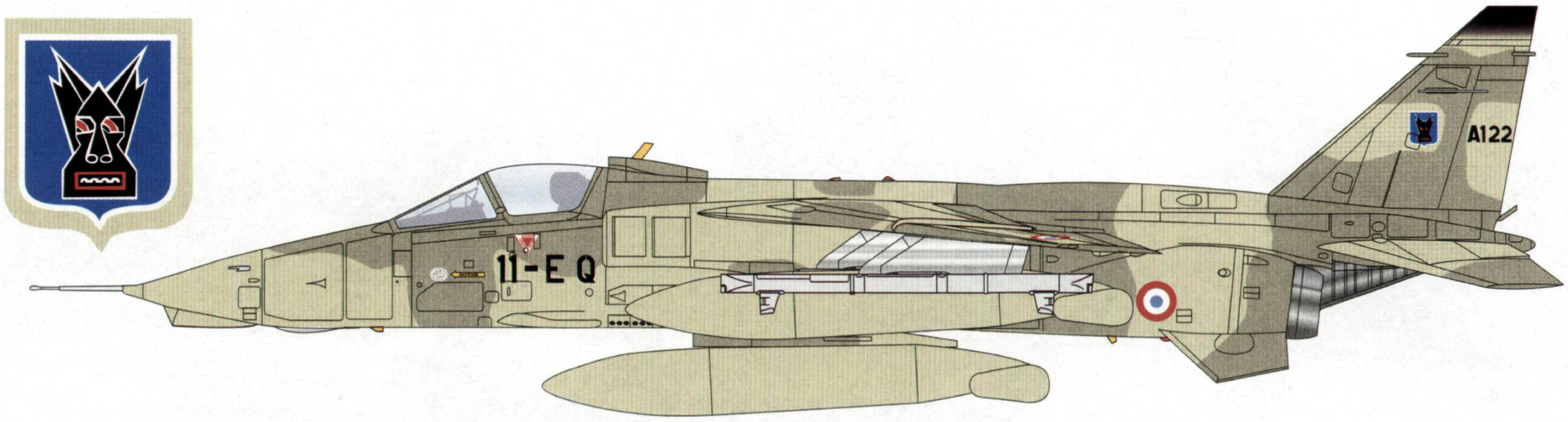
EC 1/11 'Roussillon': (GC III/6-5 and GC III/6-6)
A12 11-EB; A94 11-ES; A99 11-EI; A100 11-ER; A101 11-ED (later 11-MO); A104 11-EK; A110 (uncoded); A112 11-EA (previously 11-MO; A122 11-EQ (also coded 11-EA); A127 11-EH; A130 11-EN; A133 11-EF; A137 11-EJ; A139 11-EV; A140 11-EL

EC 2/11 'Vosges': (SPA 91 and SPA 97)
A89 11-MM; A90 11-MB; A95 11-MQ; A98 11-MT; A101 11-MP (previously 11-ED); A103 11-MA; A107 11-MV; A108 11-MP; A112 11-MO (later 11-EA); A117 11-MH; A123 11-MG (later 11-YN)

EC 3/11 'Corse': (SPA 88 and SPA 69)
A1 11-RW; A38 11-RE; A58 11-RH; A87 11-RX (see also A138); A97 11-RG; A115 11-RL; A119 11-RO; A135 11-RJ; A138 11-RX (see also A87); A149 11-RK; A153 11-RA (later coded 11-RB); A158 11-RM; A159 11-RV

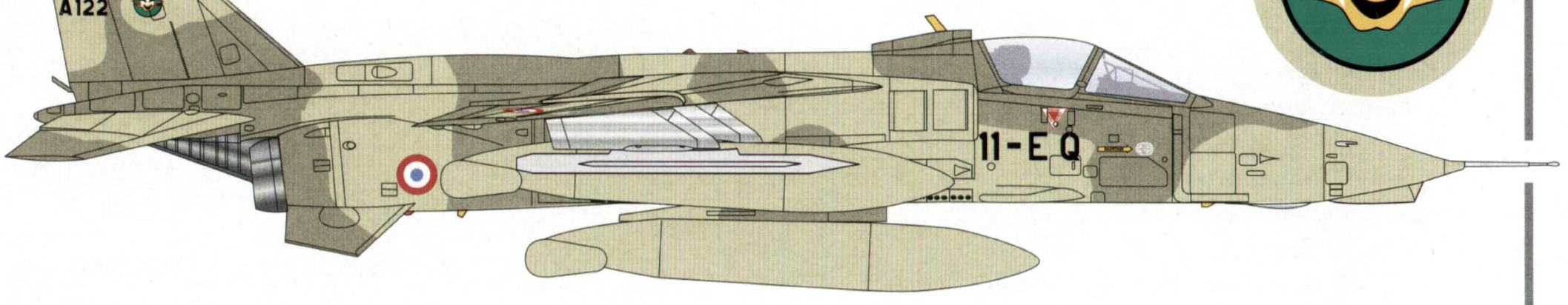
EC 4/11 'Jura': (SPA 158 and SPA 161)
A91 11-YG; A123 11-YN (previously coded 11-MG); A148 11-YD; A150 11-YK; A157 11-YS

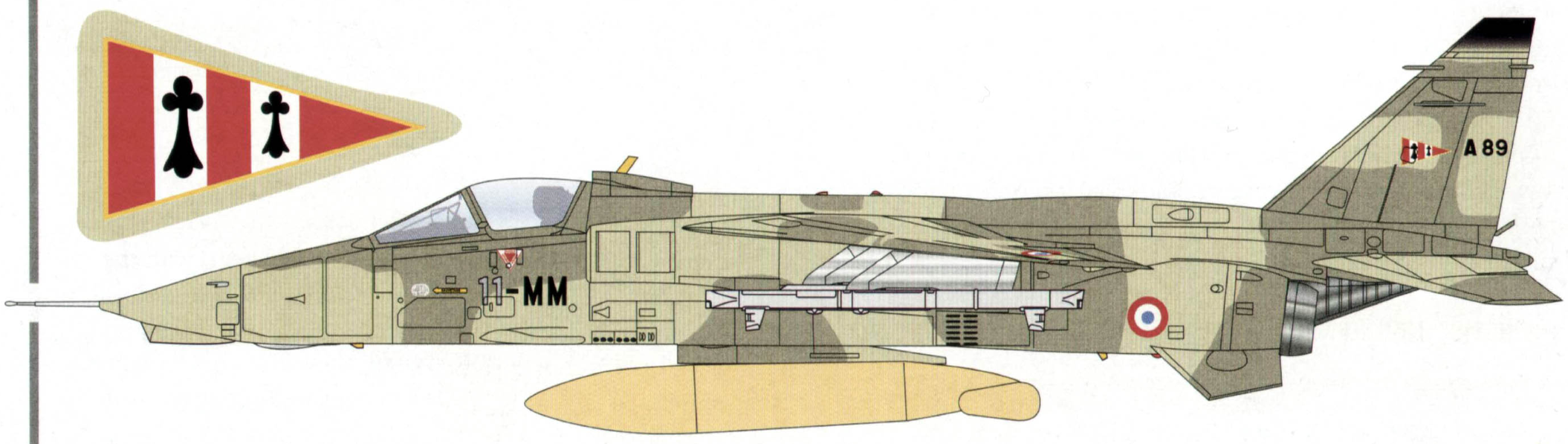




Jaguar A, A122, 11-EQ of EC 1/11 'Roussillon' Al Ahsa Air Base, Saudi Arabia, circa January 1991
Arabia Type A2 'Creme Sable' camouflage scheme

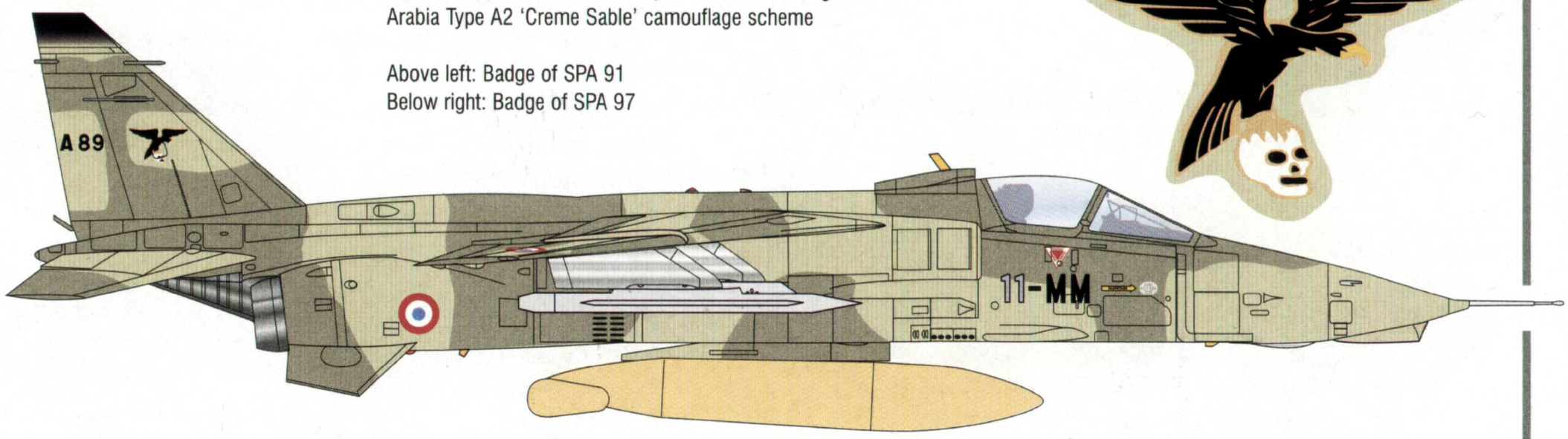
Above left: Badge of GC III/6-5 'Masque Tragique'
Below right: Badge of GC III/6-6 'Masque de Comédie'

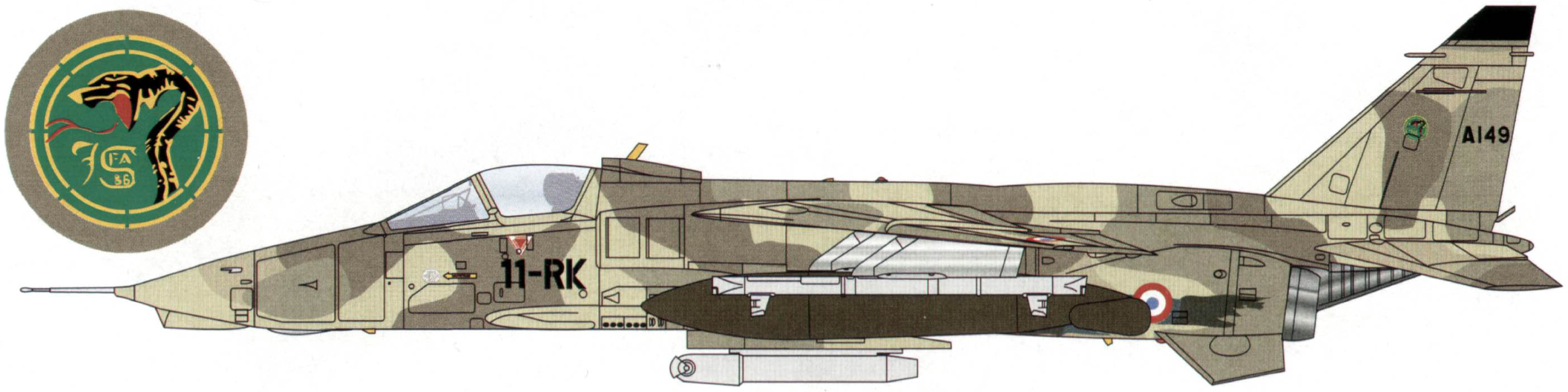




Jaguar A, A89, 11-MM of EC 2/11 'Vosges' Al Ahsa Air Base, Saudi Arabia, circa January 1991
Arabia Type A2 'Creme Sable' camouflage scheme

Above left: Badge of SPA 91
Below right: Badge of SPA 97

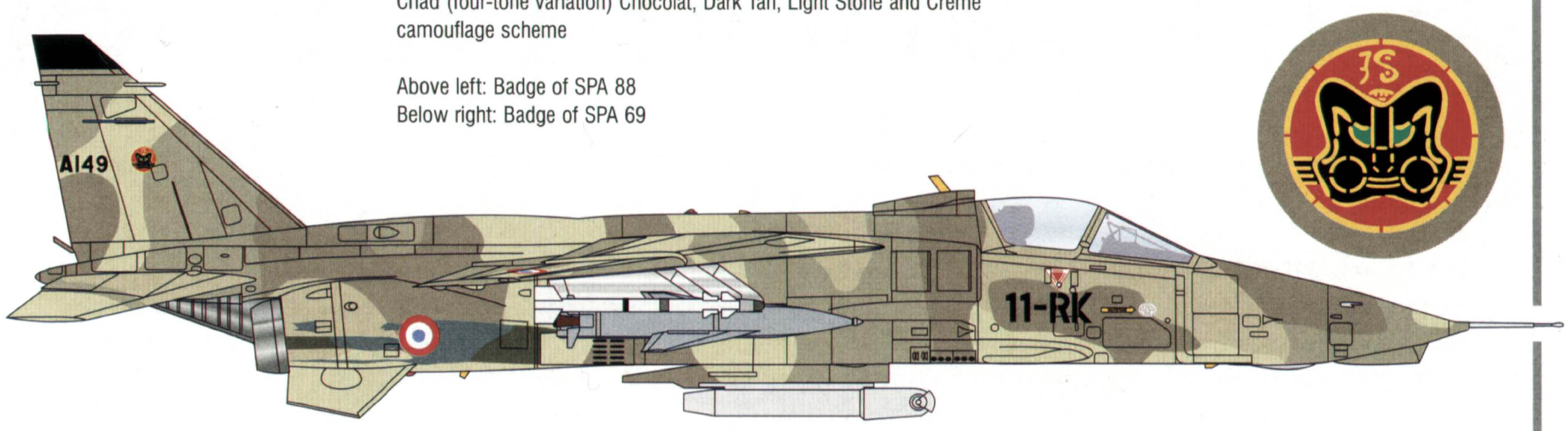


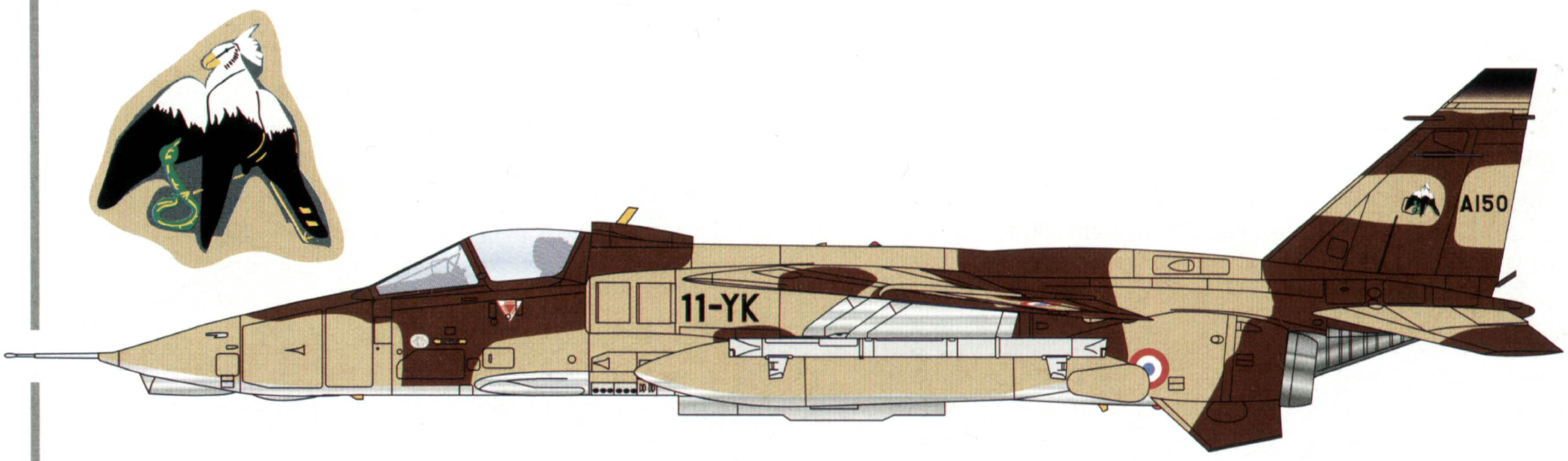


Jaguar A, A149, 11-RK of EC 3/11 'Corse' Al Ahsa Air Base, Saudi Arabia, circa January 1991

Chad (four-tone variation) Chocolat, Dark Tan, Light Stone and Creme camouflage scheme

Above left: Badge of SPA 88
Below right: Badge of SPA 69

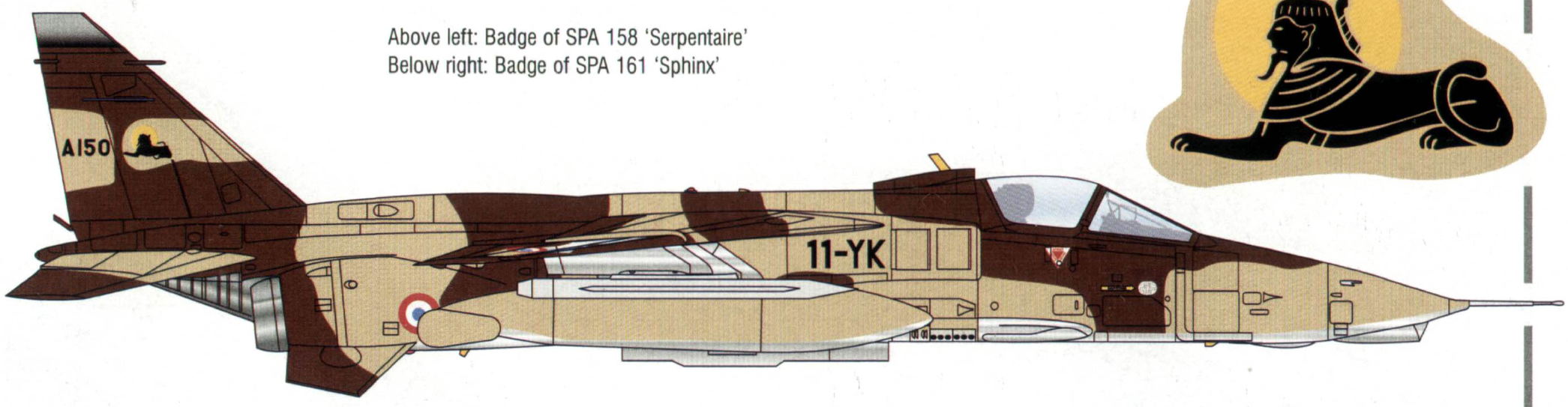




Jaguar A, A150, 11-YK of EC 4/11 'Jura' Al Ahsa Air Base, Saudi Arabia, circa January 1991

Arabia Type A1 'Melanges' (Dark Tan and Cream) camouflage scheme

Above left: Badge of SPA 158 'Serpentaire'
Below right: Badge of SPA 161 'Sphinx'





Operation Daguet

Neil Robinson models an *Armée de l'Air* 'Operation Daguet' Jaguar A in 1/48 scale

IN 1993 THE AIRFIX/HELLER CONSORTIUM PRESENTED us with a pair of excellent 1/48 scale Jaguars - an RAF Jaguar GR.1A under the Airfix label, and an Armée de l'Air Jaguar A under the Heller banner. Despite being over ten years old and reviewed in the modelling press at the time, a brief reminder of what you get and how it goes together might be appropriate.

Moulded in pale grey plastic with engraved panel and flying surface lines, both kits are identical, with just the national subtype differences and different equipment/weapons fits - moulded on separate sprues.

Referring now to the Heller Jaguar A specifically, the fuselage follows conventional construction practices and is moulded in two halves, split vertically, with separate nose cone halves for the French 'A' version, and both the TAV 38 laser range-finder (clear parts 56 and 57) and an OMERA 40 panoramic camera-fairing, clear part 58.

The cockpit interior is a bit basic for a model in this scale, consisting of a four-part ejection seat, floor and side console moulding, instrument panel and control column. Decals are provided for the instrument panel and side consoles.

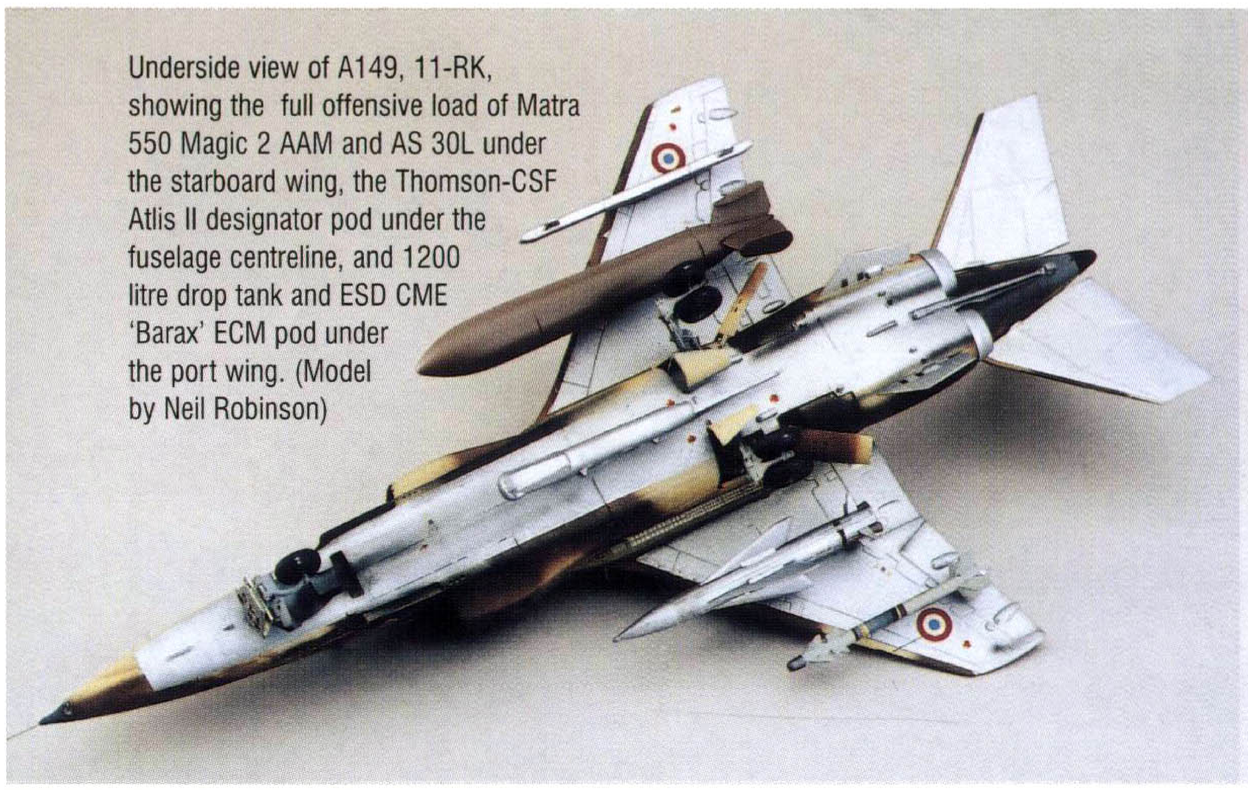
A nosewheel-well bay, (part 81), is also included, which fits onto the underside of the floor/side console moulding, (part 44), to be fitted before the fuselage halves are cemented together. The cockpit canopy is in two parts, windscreen and hood and there is also a clear Head Up Display, (part 85).

I can't help mentioning that the engine intakes could have been a bit better moulded, especially the two supplementary intake flaps, which whilst admittedly are angled-in, are not quite crisply defined enough. However, the twin DEFA 30mm cannon ports, which are separate mouldings, are excellent, and correctly portray the curved blast shields peculiar to the French version.

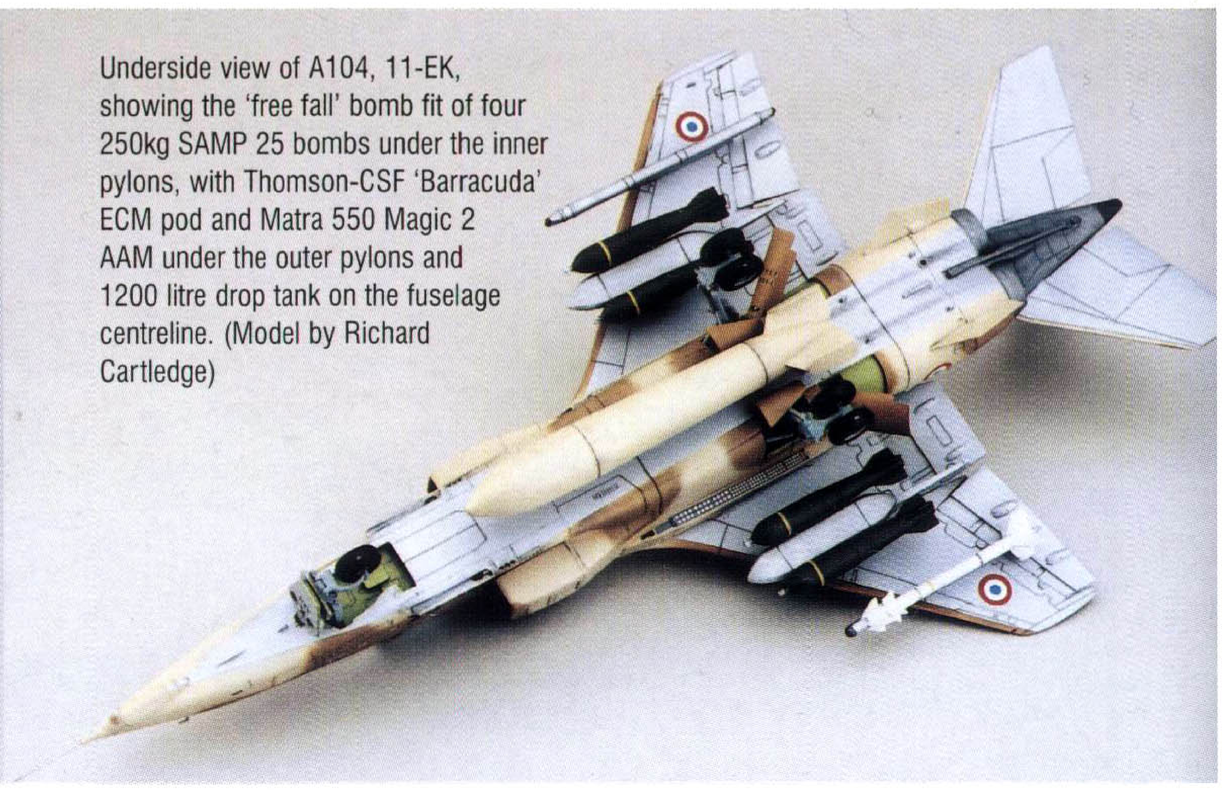
Care will have to be taken over the construction of the main and nosewheel legs, as they are made up of multiple parts, but, handled with a little care and patience look quite effective.

The Rolls Royce Turbomeca Ardour engine afterburner nozzles are separate, as is the long, runway arrester hook, which will ease painting. The stabilisers are moulded with a central spigot, which will allow you to push fit them onto the fuselage and position them at various angles of incidence and again ease painting.

The mainplane upper surfaces are moulded, (with part of the fuselage centre-section and spine), in one piece, with two separate underwing halves. Unfortunately the leading edge slats, and trailing edge ailerons and flaps are moulded-in solid with the wing, which means deploying them without the aid of a resin after-market set, could end up being a quite involved 'surgical' exercise! The chordwise overwing fences are separate



Underside view of A149, 11-RK, showing the full offensive load of Matra 550 Magic 2 AAM and AS 30L under the starboard wing, the Thomson-CSF Atlis II designator pod under the fuselage centreline, and 1200 litre drop tank and ESD CME 'Barax' ECM pod under the port wing. (Model by Neil Robinson)



Underside view of A104, 11-EK, showing the 'free fall' bomb fit of four 250kg SAMP 25 bombs under the inner pylons, with Thomson-CSF 'Barracuda' ECM pod and Matra 550 Magic 2 AAM under the outer pylons and 1200 litre drop tank on the fuselage centreline. (Model by Richard Cartledge)



Close-up of the starboard side of A149, 11-RK, showing the AS 30L air-to-ground missile under the inner pylon and the centreline mounted Thomson-CSF Atlis II designator pod. (Model by Neil Robinson)

and commendably thin, and as far as I can count, all the various antennae and blade aerials are included too.

Heller have done us proud with the underside stores they provide. Both the Thomson-CSF CME Barracuda, and the ESD CME Barax, ECM pods are included, plus the MATRA Phimat chaff/flare dispenser and the ALKAN 5020/5021 underwing/fuselage conformal dispensers.

Offensive weaponry consists of the Aerospatiale AS 30L laser guided missile and its associated fuselage centre-line Thomson-CSF Atlis II designator pod, four SEMP 250kg bombs and a Matra 550 Magic AAM.

A single 1200 litre drop-tank and various pylons and racks round off this really quite comprehensive selection, which allows two of the most common warloads used in the Gulf War to be modelled straight from the kit.

The decal sheet provides markings for a machine of EC 3/3 Ardennes based at Nancy in 1987, in the grey/green European Theatre scheme; and one of the stars of the Gulf War, A149, 11-RK, of EC 3/11 Corse, based at Al Ahsa, Saudi Arabia, in 1991.

The instructions are clear and easy to follow, but there is a minor error on the camouflage and markings drawings as the headings for the two decal options have been transposed. (Incidentally EC 3/11 is not called Vosges as printed on the instructions, but Corse. EC 2/11 is Vosges). Finally, mention must be made of the very striking box top artwork showing the AS 30L-equipped 11-RK of EC 3/11 setting off for a strike during the Gulf War.

Daguet Jaguar

Prompted by the box top artwork, four-tone camouflage scheme and AS 30L weapons fit, I finished my model as A149, 11-RK of EC 3/11 Corse, as per the Heller kit decals. No construction problems were encountered and the kit parts offered everything I needed to finish it as an AS 30L armed machine. In fact the only deviation I made from the kit instructions was the fitting of the alternative Barax ECM pod in favour of the recommended Barracuda ECM pod, (both of which are supplied in the kit anyway).

The fuel jettison pipe just above the para-brake housing was replaced with a short length of thin brass pipe, and the TAV-38 laser range finder, had its 'lense' drilled out and filled with Clearfix.



Port side view of A104, 11-EK, in the very attractive Arabia Type A2 'Creme Sable' scheme of Beige and Light Stone. (Model by Richard Cartledge)

Other than being careful to match the camouflage demarcations with both the kit instructions and the colour photos of the actual aircraft I'd found in one of the references, (see below), all I did was gently flatten the wheels so they looked as if they were 'under weight'. AM

References used:

- 'La Victoire du ceil' - an Armée de l'Air publication, published by Sirpa Air-Lavauzelle, 1991.
- 'Operation Daguet: The French Air Force in the Gulf War' - by Eric Micheletti, Concord Publications, 1991.
- 'Gulf Air War Debrief' - World Air Power Journal/Aerospace Publishing, 1991.
- 'Desert Fist' - by Ian Black, Airlife Publishing, 1991.
- AIR FAN No 132, November 1989.

And with special thanks to Paul Tuckey, Tim Darrah and David Jane.



A pair of Heller 1/48 scale Jaguar As finished in two of the colour schemes used by the Armée de l'Air in the 1991 Gulf War - A149, 11-RK of EC 3/11 'Corse', in a very weathered four-colour 'Chad' scheme, as per the kit instructions and A104, 11-EK of EC 1/11 'Roussillon', in the Arabia Type A2 'Creme Sable' scheme of Beige and Light Stone

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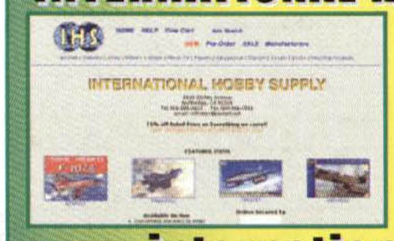
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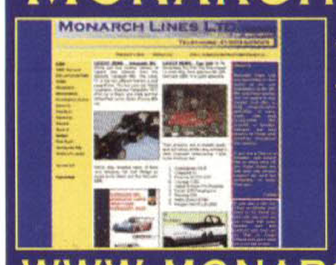
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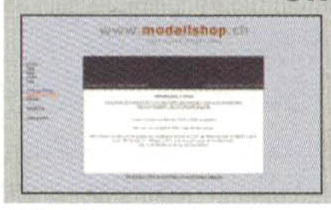
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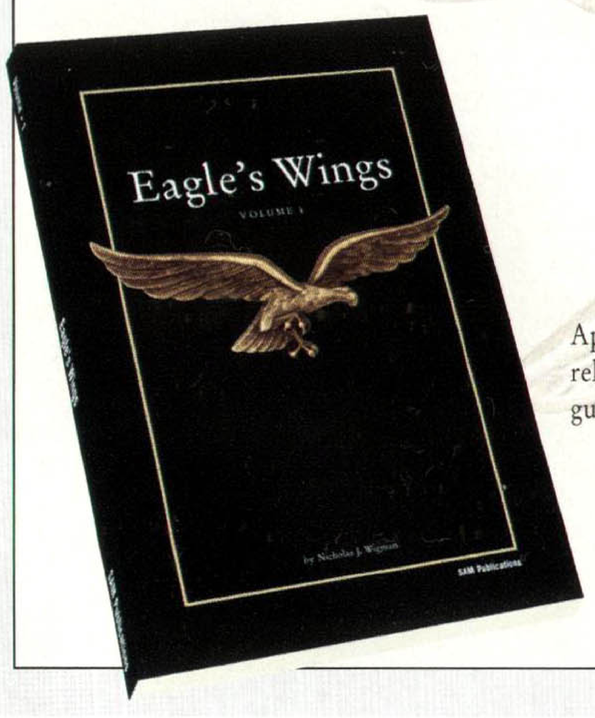
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Saturday 3 April 2004

IPMS Dorset/Poole Vikings Model Club 'Annual Model Show'

To be held at the **Poole Grammar School, Gravel Hill, Poole, Dorset**
Open 10.00am to 4.30pm. Entrance: Adults £2.00; Children and Senior Citizens £1.00. Family ticket £4.00 Club displays, Trade stands, model competitions and raffle. Refreshments available all day
Free car parking.
Contact: Andy Sweet on tel **01202 743494** or email <poole.vikings@virgin.net>

Sunday 4 April 2004

'The Shropshire Model Show'

To be held at the **Royal Air Force Museum Cosford, Cosford, Shifnal, Shropshire**
Open 10.00am to 4.00pm - all three hangars.
Trade stands, Club displays, Open Model Competition, Junior Make'n'Take sponsored by Revell, Tombola. Free Admission and parking
Contact: RAF Museum Cosford, tel **01902 376200**

Saturday 18 April 2004

'East Midlands Model Show 2004'

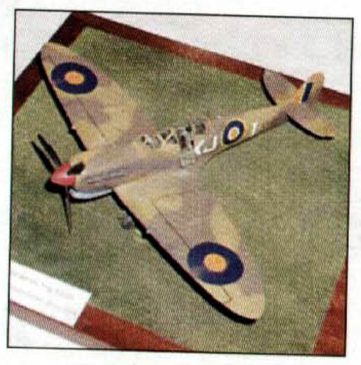
To be held at the **Hinckley Leisure Centre, Hinckley, Leicestershire**
Open 10.00am to 4.30pm.
Over 70 Club displays and Trade stands booked. Model competition (25p per entry)
Contact: Gordon Upton on tel **01455 230952** or email <www.modelspot.com/show99/04.htm>

Saturday 25 April 2004

'Gatwick Aviation Society's Airline Fair'

To be held at The Crawley Leisure centre, Crawley, Sussex
Open 10.00am to 4.00pm.
No other details or contact name supplied



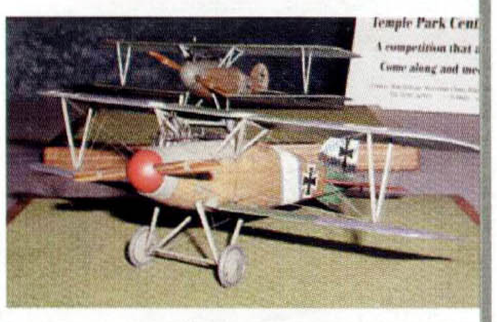


Saturday 24/Sunday 25 April 2004

'The Scottish National Model Championships2004'

To be held at **The Dewars Centre, Glover Street, Perth**
Open 10.00am to 5.00pm both days.
Club displays, Trade stands, model competitions, demonstrations and tombola.
Refreshments available all day. Free car parking.
Contact: (General enquiries) Willie Wood on tel **01259 722428** email <info@scotnats.org.uk>
or (Traders) Andy Macrae on tel **0131 669 0170** email <traders@scotnats.org.uk>
website <www.scotnats.org.uk>





The Scottish National Model Championships is an annual event. The show is more than a model competition - for two days it plays host to model traders, model clubs and special interest groups all involved with the hobby of scale models. People come from all over the UK and even further afield.
The two major model organisations affiliated with this show are IPMS (UK) and MAFVA. For more details on these organisations check the website. You don't have to be a member of these groups, however, to come and enjoy the great show.

2004

Saturday 15 May 2004

Heathrow Aircraft Enthusiasts Fair

To be held at the Feltham Community College, Bowells lane, Feltham, Middlesex
Open 10.00am to 4.00pm
No other details or contact name supplied.

Sunday 16 May 2004

IPMS Hornchurch Model Show

To be held at the Sydney Russel School, Parsloes Avenue, Dagenham, Essex, RM9 5QT
Open 10.00am to 4.o0pm.
Contact: Alan Carr, 5 Roslyn Gardens, Gidea Park, Essex. tel **01708 747849** or email <acarr.jaglancia@virgin.net>

Saturday 5 June 2004

Northern Scale Model Show 2004

To be held at the Gateshead International Stadium, Gateshead, Tyne & Wear
Open 10.00am to 4.30pm.
Contact: G Trotter, 9 Rock Terrace, Sulgrave, Washington, Tyne & Wear NE37 3AH

Saturday 1 August 2004

Aeroventure Model Show

At the **Doncaster Lakeside Aeroventure Aircraft Museum, Doncaster, South Yorkshire**
Open 10.00am to 4.00pm.
Club displays, Trade stands, Kit Exchange plus on-site Museum Exhibits
Contact: John Morley, 'Bonlea' Station Road, Blaxton, South Yorkshire DN9 3AA. tel **01302 771954**

Sunday 10 October 2004

IPMS Lincoln 'Expo 2004' Model Show

To be held at the **Grandstand, Southwell Racecourse, Southwell**
Open 10.00am to 4.30pm. Free admission.
Club displays, Trade stands, 30 Class Model competition, On-Site catering. Free Parking
Contact: Steve Hesse, 31 Arboretum Avenue, Lincoln, LN2 5JE. tel **01522 541146**

Sunday 7 November 2004

Elsecar Model Show

To be held at the **Elsecar Heritage Centre, Wath Road, Elsecar, Barnsley**
Open 10.00am to 4.30pm. Entrance: Adults £2.00; Children & Senior Citizens £1.00. Family £5.00
Club displays, Trade stands, Model competition, On-Site catering, Free Parking
Lots to see and do on the Elsecar Heritage Centre site - a day out for ALL the family!
Contact: Martin Blundell on tel **01226 753649** or Roger Evans on **01226 203784**

Saturday 20/Sunday 21 November 2004

Scale Modelworld - IPMS UK National Championships

To be held at **Telford International Centre**
Open 10.00am to 5.00pm both days.
Club displays, Trade stands, model competitions, demonstrations and tombola. Refreshments available all day. Free car parking.

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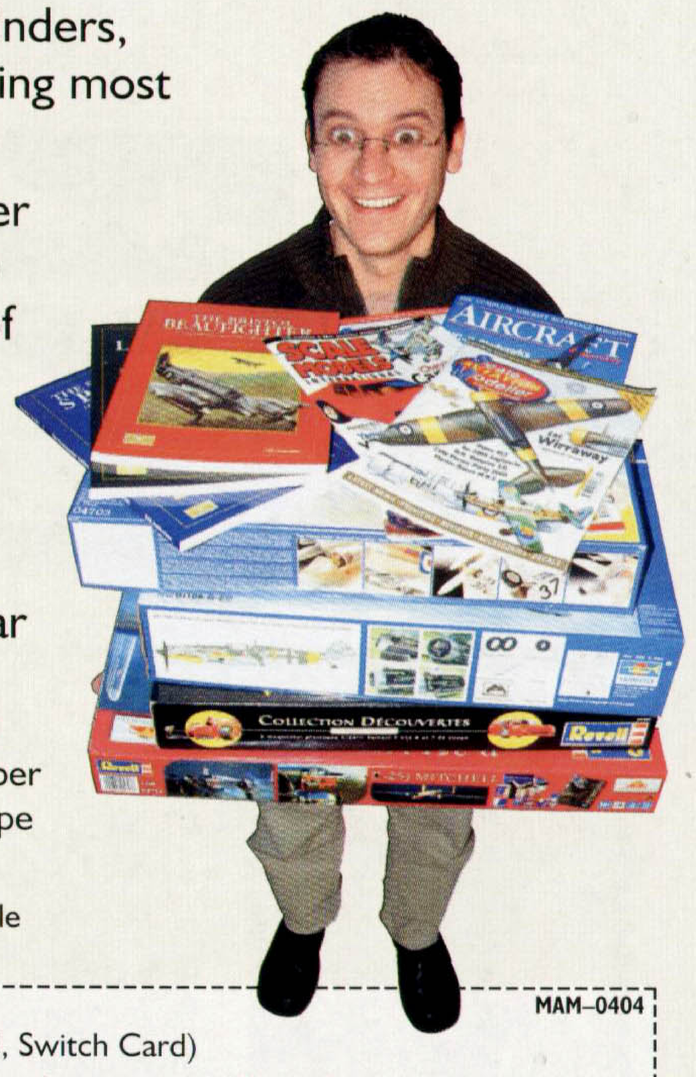
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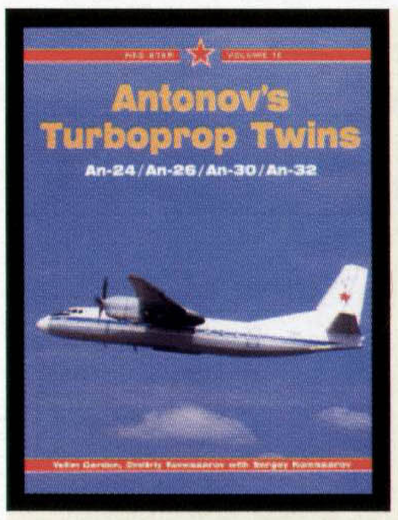
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In Print



Red Star Volume 12
by Yefim Gordon &
Dmitry Komissarov
Ian Allan Publishing
UK price £18.99

'An-24/-26/-30/-32 - Antonov's Turboprop Twins'

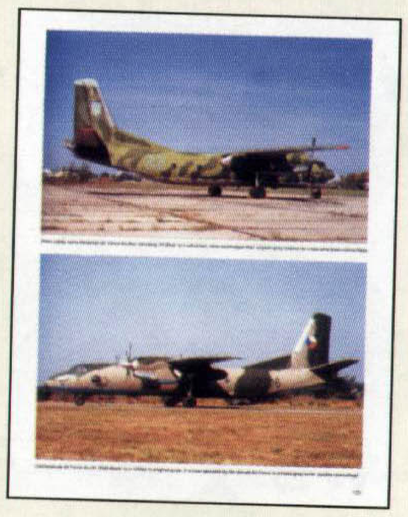
Red Star continue their excellent series with the Antonov An-24 family, a feeder-liner designed in 1957. The first An-24 variant was a standard passenger aircraft which saw service in a number of roles, including use by the Soviet Air Force. All the sub-variants are discussed and supported with masses of photographs.

Then comes the next generation with the design modified as a transport aircraft, designated An-26, and as you might expect there is a sub-variant to suit every purpose. The next chapter covers both these aircraft in detail with plenty of close-up shots of both the insides and the outsides.



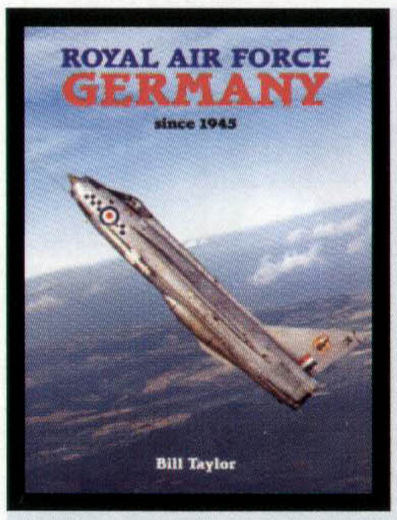
Next Antonov produced a photographic variant, which was designated as An-24FK, later changed to An-30. This again was a 'maid of all work'. Some were used for photographic mapping, others as meteorological protection aircraft, then chemical and radiation reconnaissance machines and a dozen other jobs.

Lastly comes the An-32. This military transport was an export variant, developed for the Indian Air Force. Again there is plenty of cover of the aircraft both in text and illustrations. When you have absorbed all that you can peruse the Local Airline Service Listings and finally read the last chapter that covers these aircraft at war. And, to complete this book, there is a colour photograph section and scale drawings of the An-30 and 32.



This is the usual slick volume we have come to expect with this Red Star series and if this is your subject - don't hesitate, buy it now whilst stocks last!

Ernie Lee



by Bill Taylor
Ian Allan Publishing
UK price £35.00

'Royal Air Force Germany since 1945'

It is only in the last few years that authors dealing with camouflage and markings have really started to investigate this subject. In the early post-war years it was a time of change with new aircraft replacing war-weary ones and with a few paint anomalies to boot.

This history will help to fill some of the gaps. It is a real tome, an A4 hardback with some 240 pages, but this is a big subject, spanning over 50 years. There is far too much in it to describe fully, in fact I can hardly do it justice with the space I have, so all I can do is to select a few titbits to give you some idea.



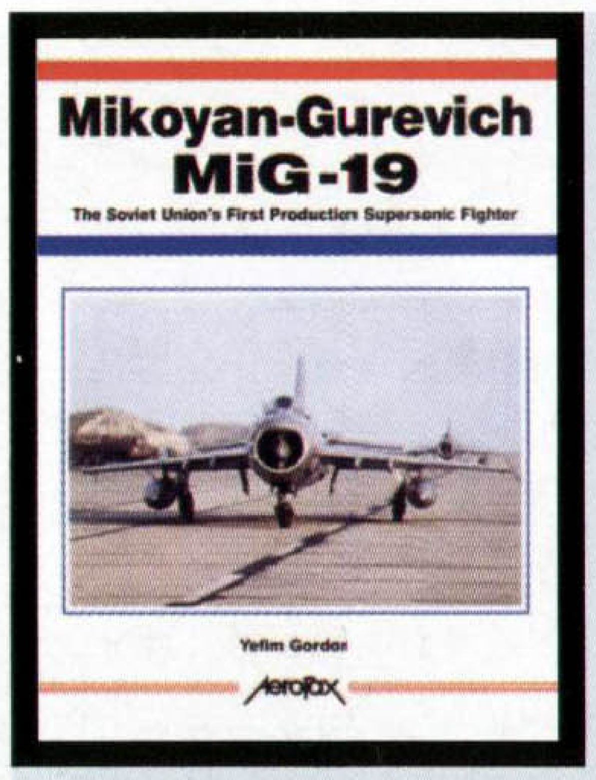
The first chapter chronicles the transition to peace and some of this makes fascinating reading. I was particularly interested in the work that went on to collect and investigate ex-*Luftwaffe* equipment. It is also a sad chapter for any aviation enthusiast to read. If only someone had had the foresight to put these wonderful aircraft in some disused hanger after the boffins had finished with them and preserve them until funds were available to restore them.



The main part of the book carefully chronicles the history of RAF(G) supplemented with hundreds of good clear photographs showing the gradual displacement of mainly piston-engined types with the 'paraffin burner'. This hefty volume describes, I suppose, the most dangerous fifty years in the history of the world, with nuclear powers facing each other across a partitioned Germany. It describes the first real 'test', the Berlin Air Lift, followed by the strengthening of NATO and the gradual replacement of the early jets with more competent machines and cumulating with the Tornado, Buccaneer, Jaguar and Harrier.

You will find just about all you want to know about RAF Germany in this book, and to complete the package, twelve pages listing such things as the Order of Battle at various significant times, plus details of all the units that served there. Whilst this book is very useful to the modeller, it is an absolute 'must have', for the aviation enthusiast.

Ernie Lee

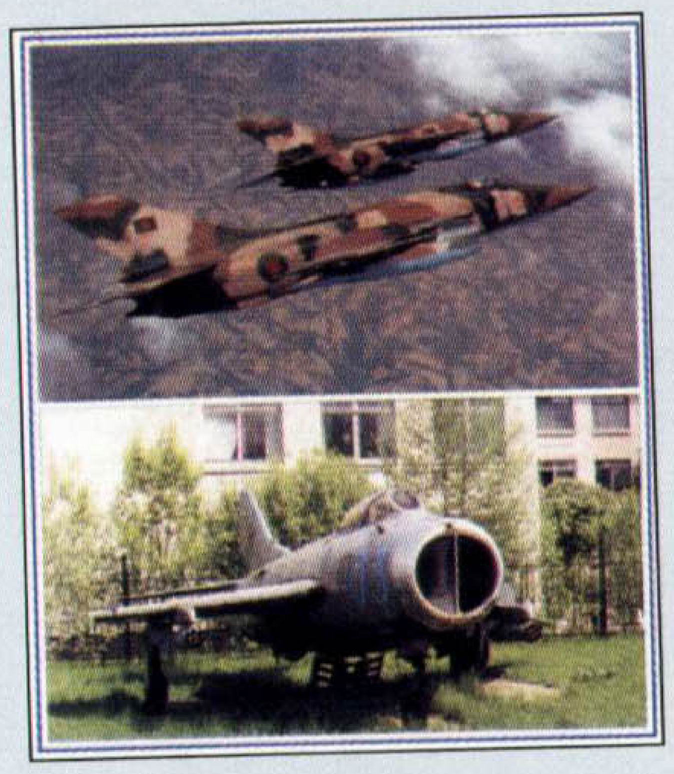


'Mikoyan-Gurevich MiG-19'

by Yefim Gordon
Midland Publishing
UK price £19.99

This is the latest book in the Aerofax series and one of the few that I have seen devoted to just this aircraft. This softback has 160 pages, and when I started reading it I understood why. The number of variants is amazing - there is a lifetime's worth of modelling here!





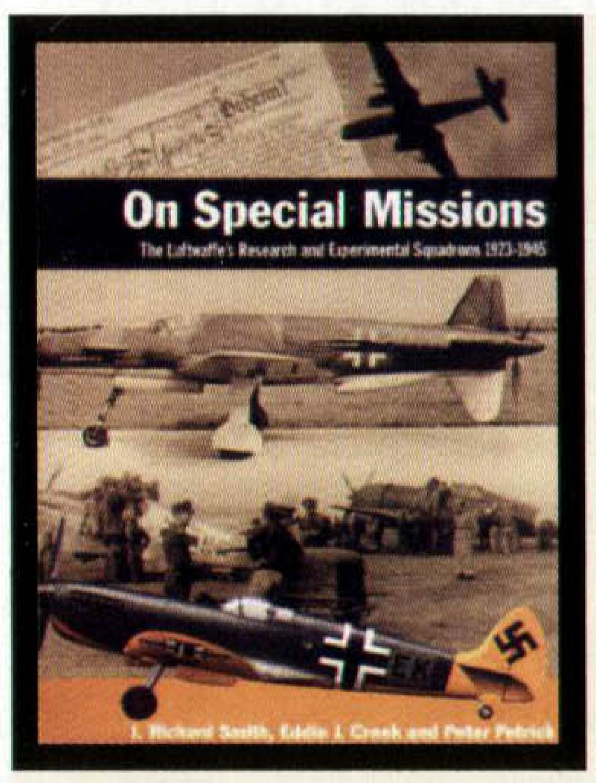
As is usual with this author, the development history is meticulously detailed, the text being interspaced with a large number of photographs. The second section is devoted to the MiG-19 in action, followed by a chapter describing its worldwide operators and, lastly, an aircraft in detail section.

I have to admit to being really taken-aback by the number of variants that were produced. Including the Chinese-built machines, this book deals with no less than fifty-eight variants, all of which are illustrated as either line profiles or five-view drawings. Also included is a four page colour photo section and fifty-five colour profiles, plus a colour four-view.

Even though some of the differences are slight this is still a magnificent reference. Whatever nationality you wish to model, then the colour profiles will help. As well as the standard natural metal finish of most Soviet operated aircraft, we have camouflaged examples of Pakistani, Chinese, Egyptian, East German, Syrian and Bulgarian operated machines. And, if you are 'into' colourful subjects, you will find a good few in here - such as a MiG-19S with red upper surfaces of the Russian display team; a similar aircraft from East Germany in red, blue and yellow; and a 'sharkmouth' F-6 of the Pakistan Air Force.

I can heartily recommend this book to all Russian aircraft enthusiasts.

Ernie Lee



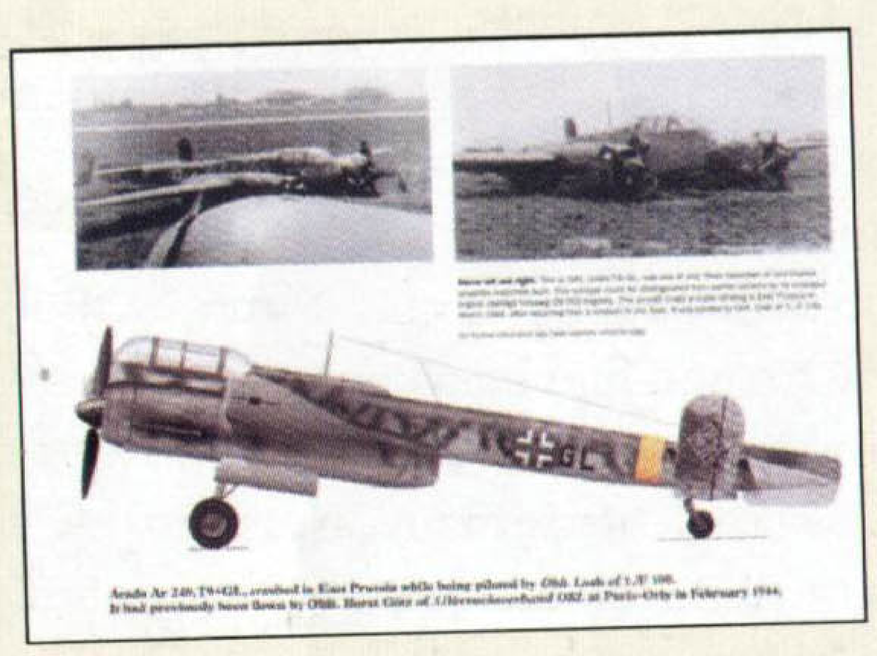
'On Special Missions'

by J Richard Smith, Eddie Creek & Peter Petrick
Classic Publications
UK price £19.95

Sub-titled '*The Luftwaffe's Research and Experimental Squadrons 1923-1945*', this 128-page hardback will fascinate both purely aviation enthusiast and the modeller of German aircraft. Over the years, in conversation with aviation enthusiast orientated friends, it always seems to be the subjects that are not discussed in great detail in the various text books that interest them most! Hopefully this book may fill a few gaps.



Although it describes the various units, there are quite a number of quotes from *Luftwaffe* personnel describing their activities. There has recently been published information and artwork relating to the clandestine photographic reconnaissance operations undertaken by the British prior to World War Two. It seems that similar operations were carried out by German airman.



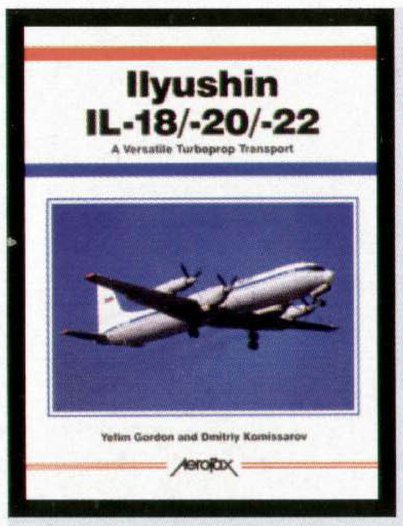
The first chapter tells the story of the reconnaissance units. The first airman to carry out these duties was Theodor Rowehl flying Junkers F.13s and Junkers W.34s. He flew missions over the 'Polish Corridor' in the early 1920s. This reconnaissance work progressed to photographing the Soviet Union and the fortifications across the German borders in Western Europe.

If you are intent on modelling some of the aircraft involved, there is information on the registration and serial numbers of the early machines and also photographs of later reconnaissance aircraft. One of these shows an interesting camera blister under the fuselage of a Dornier Do 215B-4. It is possible, with information in this chapter, to build up a collection of machines used for photographic purposes, of such things as the Junkers Ju 88T-1 and the Arado Ar 240. All are illustrated with photographs and colour profiles.

The book moves on to various trials, such as puncture proof tyres on a Bf 109G-6/U2/AS. Unfortunately on one trial they didn't puncture - one of them just came off the rim! You will find plenty of other useful information among the photographs. You can build a fascinating set of captured aircraft in *Luftwaffe* service by using the photographs and colour profiles in the chapter dealing these aircraft. They include the Typhoon, P-47, P-38, P-51, Spitfire and a Mosquito Mk IV as well as photographs of the Stirling and Harvard.

There is plenty of information that I have not mentioned, so I suggest you take a look at this book soon, I guarentee you won't be disappointed.

Ernie Lee



Ian Allan Publishing
Yefim Gordon & Demitry Komissarov
UK price £19.99

Ilyushin IL 18/20/22 – AeroFax title

The Il-18 turboprop was originally designed as a long-range airliner, but like many aircraft in its class it was developed further until it served in a variety of roles, and when it became a military aircraft NATO named it Coot.



After an introduction the first chapter deals with the Il-18 in its civil guise, as an airliner, VIP transport, Polar Research aircraft, and even a Fishery Reconnaissance machine (these are just a few of the variants). After a brief discourse on the Il-24 Ice Reconnaissance aircraft we have a chapter illustrating in close-up some of the features of the Il-18, followed by its service history in civilian use. Military use comes next as the Il-18 and Il-22. Another development is the Il-38 Sub Hunter (like the Il-24 this designation is not mentioned in the book title). All this is followed by colour shots of the Il-38 cockpit and a detailed list of operators, a production list, a colour photo section and, to tie the whole thing in, scale drawings covering no fewer than 29 variants. This book is an A4 soft back with 160 pages, and it needs to be, it is a complex subject which the authors cover remarkably well, with informative text and masses of photographs. For enthusiasts of Soviet aircraft it is well worth the asking price.

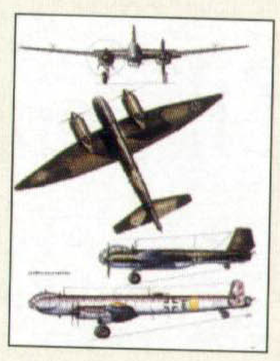
Ernie Lee



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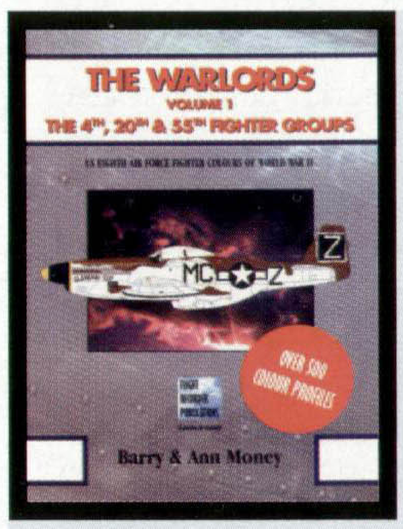
This is the second book in the Black Cross series and as far as the modeller is concerned it is more useful. It follows a similar format to the previous volume with the development history of each type.



Many of the numerous photographs are from official sources and quite a number are detail shots of both inside and out. They are all of excellent quality and big enough to be of value. As well as the aforementioned photographs there are a large number of technical diagrams, some of which are of more value to the enthusiast than the modeller, but others are modeller friendly,, with such details as the undercarriage and interior. The modelling section, apart from a number of very well made models, is really a synopsis of available kits, which I am afraid, is depressing. The ones that are out there will be difficult to find. I built an early variant of the Ju 388 using the Delta conversion kit, but there are other variants of this that need producing in either resin of injected plastic as well as the Ju 288 and Ju 488. These machines are like no others, the excellent artwork shows them in all their eccentricity and I can only hope that they will read this in the Czech Republic!

I find this 94 page A4 softback good value for money and one that should be in the library of all students of the Luftwaffe.

Ernie Lee



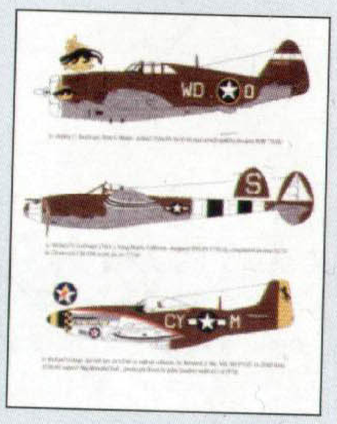
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'The Warlords: Volume 1'

One of my fantasies is to have a library where each separate aspect of aviation can be found individually in a book, or set of books. Such things as cockpits, cutaways, rigging details for every biplane or maybe undercarriage details, then I could have a hundred or so books instead of a couple of thousand!

This will never happen, but in one aspect the publishers of this volume have made a start. They intend to cover all the fighters used by the 8th Air Force in World War Two for which they have photographic evidence!

Each aircraft is depicted as a colour profile drawn to 1/72 scale. This particular book covers the 4th, 20th and 55th Fighter Groups, and there are over 500 images. It is set out by squadron with each profile captioned with information such as pilot and extra colour details. The amount of information within one book is staggering.



Even with all those profiles they have managed to squeeze in some contemporary photographs and an index, listing pilot, serial number, code, type and, of course, where to find it. Believe me with this number of images you need it! I can already hear some critics asking why only one side is shown, but it must be remembered that many aircraft were only photographed from one side.

Even with this massive coverage there are gaps. The authors acknowledge this and I am sure that they would welcome any information from private archives. I cannot see any serious student of the USAAF would want to be without this book, it has to be their number one target!

Ernie Lee

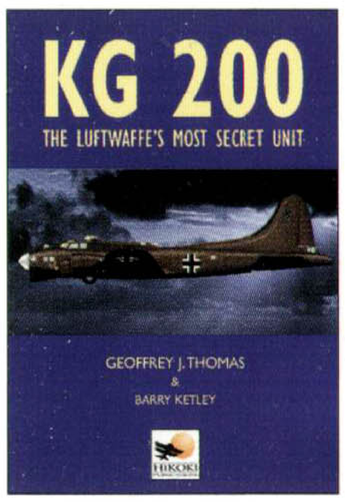
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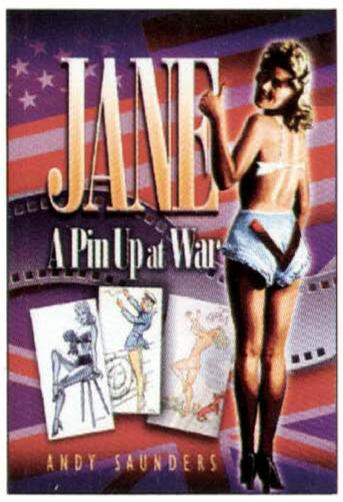
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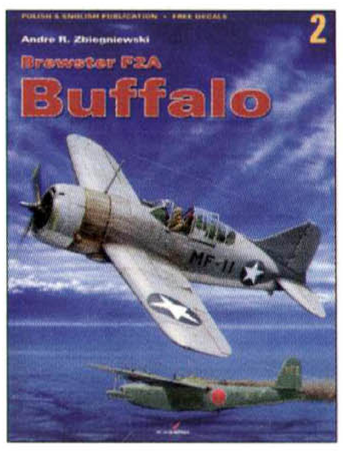


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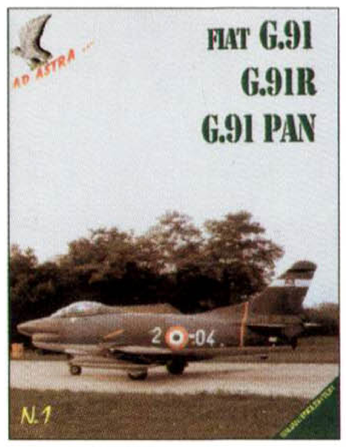
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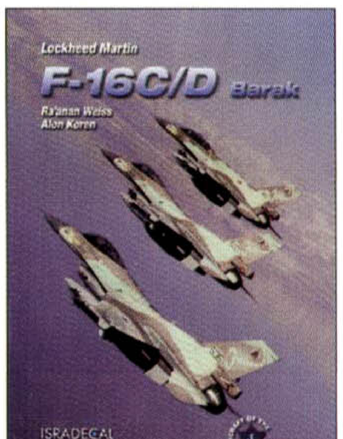
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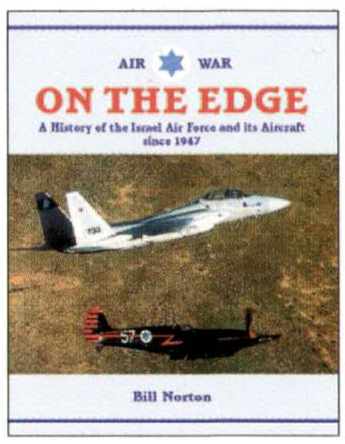


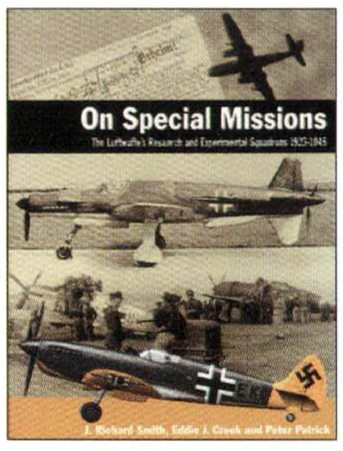
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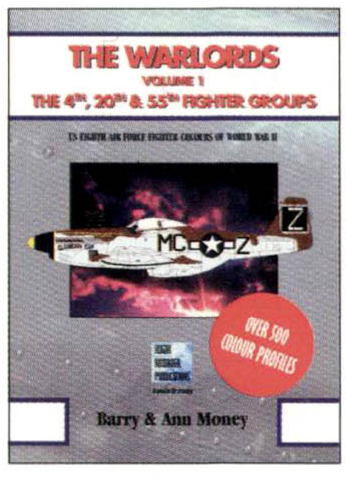
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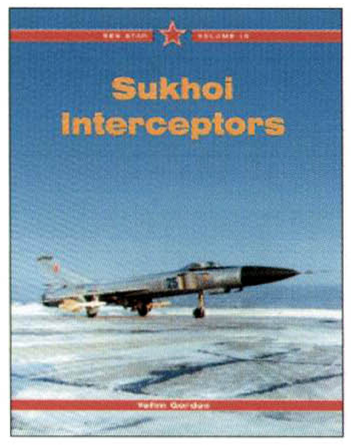




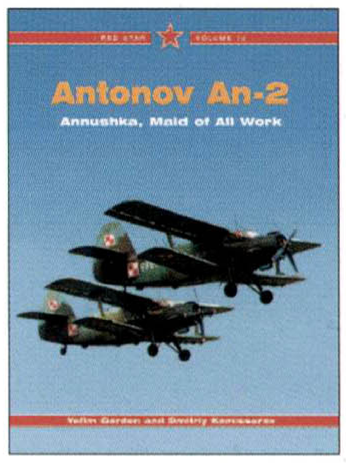
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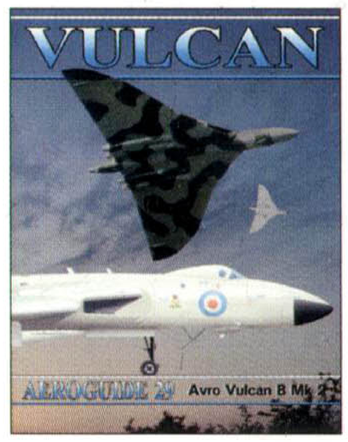


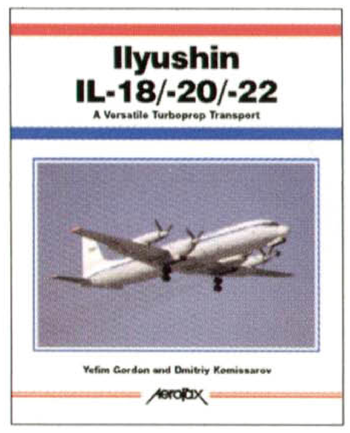
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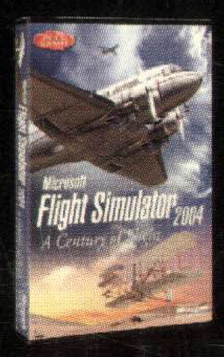
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